DOCUMENT RESUME

ED 432 466 SE 062 701

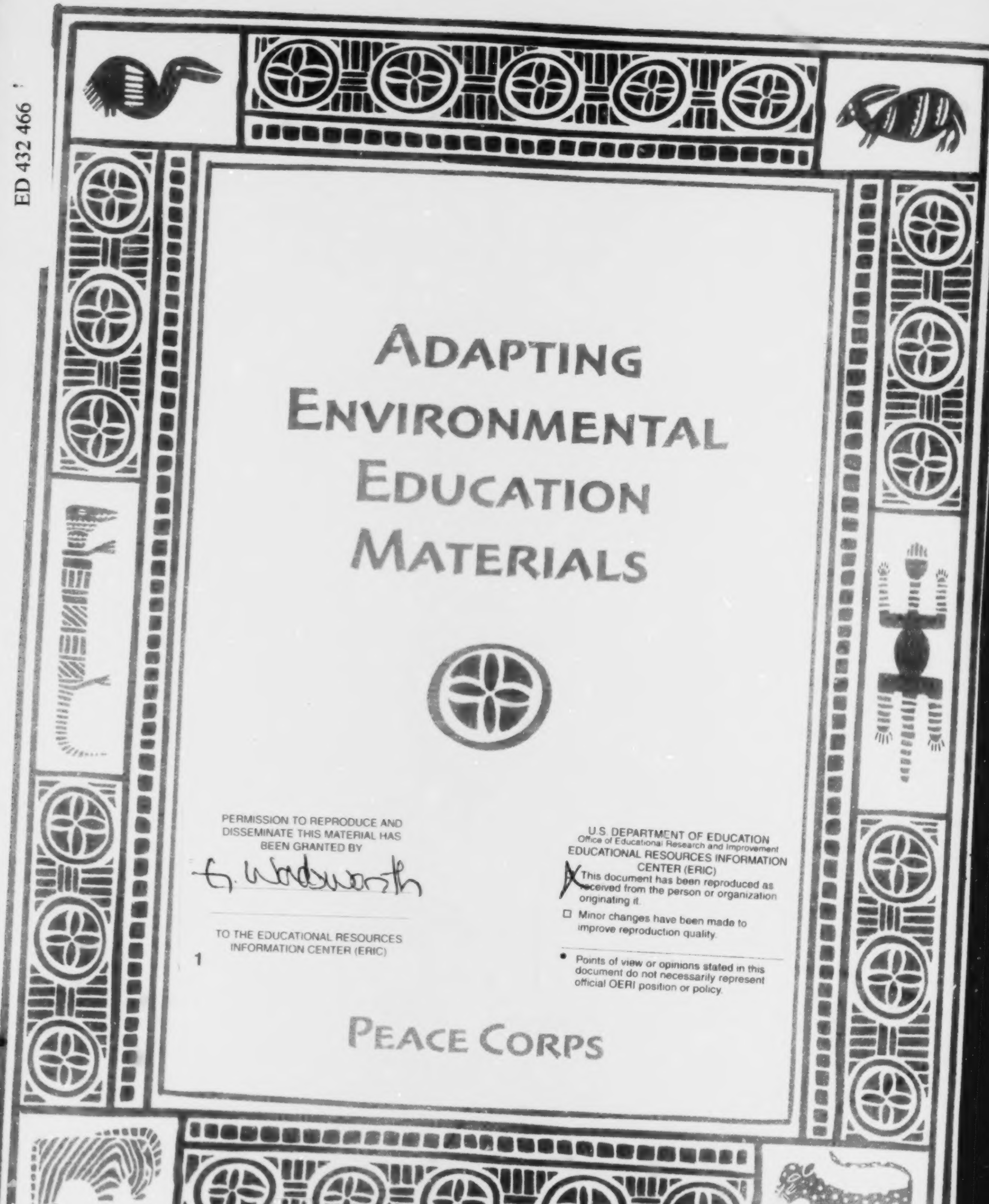
TITLE	Adapting Environmental Education Materials.
INSTITUTION	Peace Corps, Washington, DC. Information Collection and Exchange Div.
REPORT NO	M0059
PUB DATE	1999-02-00
NOTE	185p.
AVAILABLE FROM	Peace Corps, Center for Field Assistance and Applied Research, Information Collection and Exchange, 1111 20th Street NW, 5th Floor, Washington, DC 20526.
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	*Educational Resources; Elementary Secondary Education; *Environmental Education; Foreign Countries; *Instructional Materials; *Media Adaptation; Outdoor Education; Resource Centers; Service Learning; *Teaching Methods
IDENTIFIERS	Peace Corps

ABSTRACT

This publication provides Peace Corps volunteers and others who conduct environmental education activities in schools, environmental education centers, parks, and communities with the tools to adapt existing environmental education resources to local environmental issues, cultures, and audiences. Sections include: (1) the process of adapting materials, which includes review, evaluation, and steps for adapting; (2) specific examples in which good materials were adapted to be relevant to diverse settings; (3) a training design and several training plans that can be used to introduce and practice adaptation techniques in workshops for educators; and (4) selected readings and resources for further investigation of the topic. (CCM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 432 466



ADAPTING ENVIRONMENTAL EDUCATION MATERIALS

PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL HAS
BEEN GRANTED BY

G. Wadsworth

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PEACE CORPS

SE062701

BEST COPY AVAILABLE

INFORMATION COLLECTION AND EXCHANGE

This publication was produced by the Peace Corps Center for Field Assistance and Applied Research. It is distributed through the Information Collection and Exchange (ICE). For further information or additional copies please contact ICE and refer to the ICE Catalog number that appears on the publication:

PEACE CORPS
CENTER FOR FIELD ASSISTANCE AND APPLIED RESEARCH
INFORMATION COLLECTION AND EXCHANGE
1111 20TH STREET NW - FIFTH FLOOR
WASHINGTON, D.C. 20526

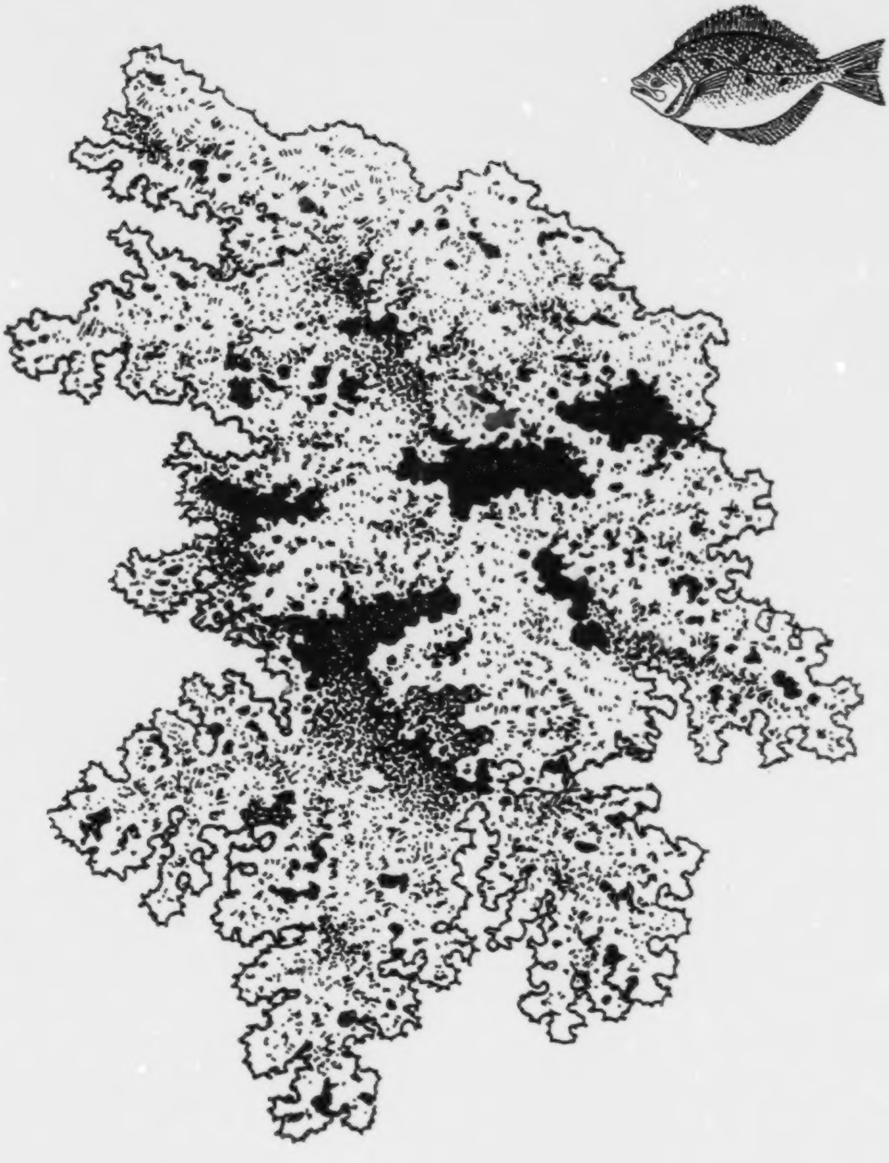
Add your experience to the ICE Resource Center. Send your materials to ICE or the Center for Field Assistance and Applied Research so that we can share them with other development workers. Your technical insights serve as the basis for the generation of Peace Corps manuals, reprints, and training materials. They also ensure that the Peace Corps is providing the most up-to-date, innovative problem solving techniques and information available to you and your fellow development workers.

ADAPTING ENVIRONMENTAL EDUCATION MATERIALS

PEACE CORPS

FEBRUARY 1999

INFORMATION COLLECTION EXCHANGE # M0059



5

CONTENTS

Acknowledgments v

How to Use This Manual ix

Introduction 1

Why Adapt Materials? 5

  Begin With a Plan 9

  Identifying People That Need to be Involved 10

  Identifying Important Environmental Issues 11

  Identifying Solutions to Environmental Problems and the Role of Education 12

  Identifying, Screening, and Selecting Environmental Education Materials 14

  Copyright Issues 23

  Adapting and Testing Materials 25

  Implementing an Environmental Education Program 35

  Evaluating a Program and the Effectiveness of Adapted Materials 37

  Principles of Successful Adaptation 39

Adaptation Examples 41

  Example 1: Adapting for Simpler and Fewer Materials 41

  Example 2: Adapting to Local Realities 53

  Example 3: Adapting Environmental Education Lessons to Traditional Classroom Subjects 58

  Example 4: Adapting Interpretive Programs 65

  Example 5: Adapting Environmental Education Comic Books 68

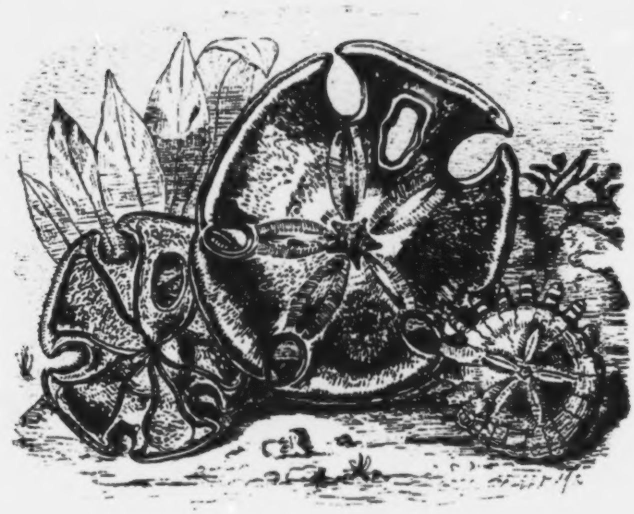
  Example 6: Adapting Nonformal Youth Development Programs 72

Training Educators About Adaptation 77
  Conducting an EE Workshop 77
  Session Plans 83
    Planning for Successful Adaptation of EE Materials 83
    Adapting a Lesson to Local Realities 93
    Simplifying and Adapting Text 103
    Adapting Lessons to Different Environments and Cultures 108

Forms and Handouts 119

Other Resources and Readings 133
  Environmental Education Materials: Guidelines For Excellence 133
  Elementary Schools in Rural Honduras: Exporting Environmental Education Models 156
  Glossary 153
  Resources Available Through ICE 162
  Resources Not Currently Available from ICE 164
  Other Addresses and World Wide Web Sites 165

ACKNOWLEDGMENTS



Adapting Environmental Education Materials grew out of the needs of the field and as a companion volume to *Environmental Education in the Schools*. As with the first manual, many individuals and organizations outside of the Peace Corps have collaborated in its production.

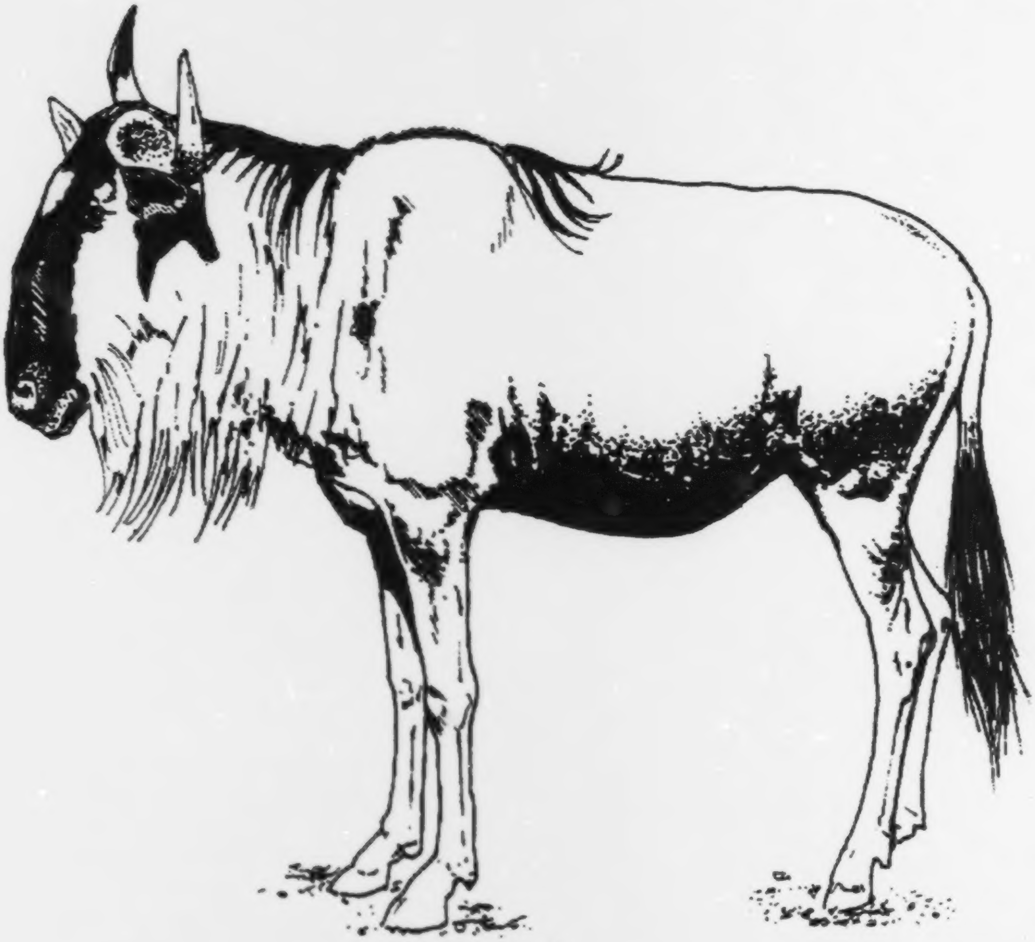
The Peace Corps would like to acknowledge the following: Michele Campbell, Project WILD; Tim Donahue, Global Rivers Environmental Education Network; Jim Gale, USDA Forest Service; Helen Gillman, Community Forestry Unit, FAO; Sam Ham, University of Idaho; Martha Monroe, GreenCOM; Mary Paden, World Resources Institute; Meena Raghunathan, Centre for Environmental Education; Anna Sherwood, Community Forestry Unit, FAO; William Seiders, Sustainable Development Unit, FAO.

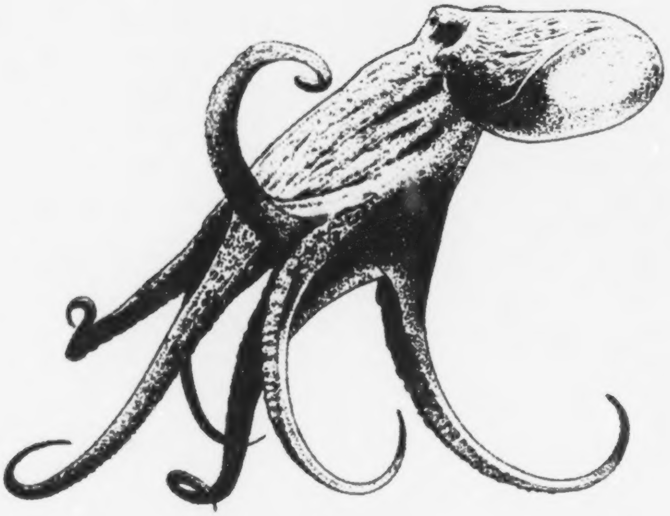
Thanks is also extended to the following companies and organizations for permission to include excerpts and examples from their publications in this manual: National Wildlife Federation, Vienna, Virginia, USA; Centre for Environmental Education, Thaltej Tekra, India; Schlitz Audubon Center of the National Audubon Society, Milwaukee, Wisconsin, USA; Fieldston Lower School, The Bronx, New York, USA; National Science Teachers Association, Arlington, Virginia, USA; Project WILD, Bethesda, Maryland, USA; North American Association for Environmental Education, Washington, DC, USA; Community Forestry Unit of the Forestry

The Peace Corps extends its thanks to those who shared their experiences and materials, which led to further refinement of the ideas presented here.

Department of the Food and Agriculture Organization of the United Nations, Rome, Italy; and 4-H Cooperative Curriculum System, University of Minnesota, St. Paul, Minnesota, USA.

The Peace Corps also acknowledges the staff and Volunteers who field tested the sessions in Poland in 1996; presented and reviewed the materials—Betsy Carlson, Andrea Deri, Heidi McAllister, Marc Lippman, George Mahaffey, Jacob Fillion, William Helin; and wrote and edited the manual—Judee Blohm and Jaime Watts.





HOW TO USE THIS MANUAL

BEGIN WITH A PLAN

The initial section focuses on how to adapt materials. It begins with the idea that adaptation should take place within the framework of an environmental education program to address program goals and objectives. The section also discusses copyright and development of partnerships to adapt materials. Another focus of the section is recognizing excellence in environmental education materials so that only the best available materials are adapted.

ADAPTATION EXAMPLES

The second section presents six examples that illustrate how materials can be adapted from one place to another, problems that can arise, and how they can be overcome. Topics include Adapting for Simpler and Fewer Materials, Adapting to Local Realities, Adapting Environmental Education

TRAINING EDUCATORS ABOUT ADAPTATION

In the third section, materials for training educators in adaptation are presented. It includes four lesson plans that can be used in workshops to address the topic of adaptation and an in-service training design. Each lesson plan is a step-by-step module for trainers.

FORMS AND HANDOUTS

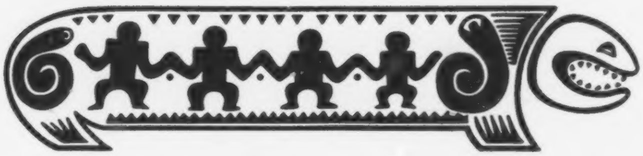
All forms and handouts presented throughout the manual are here. They can be used to make displays for training programs, as handouts for in-service training, or in team planning exercises.

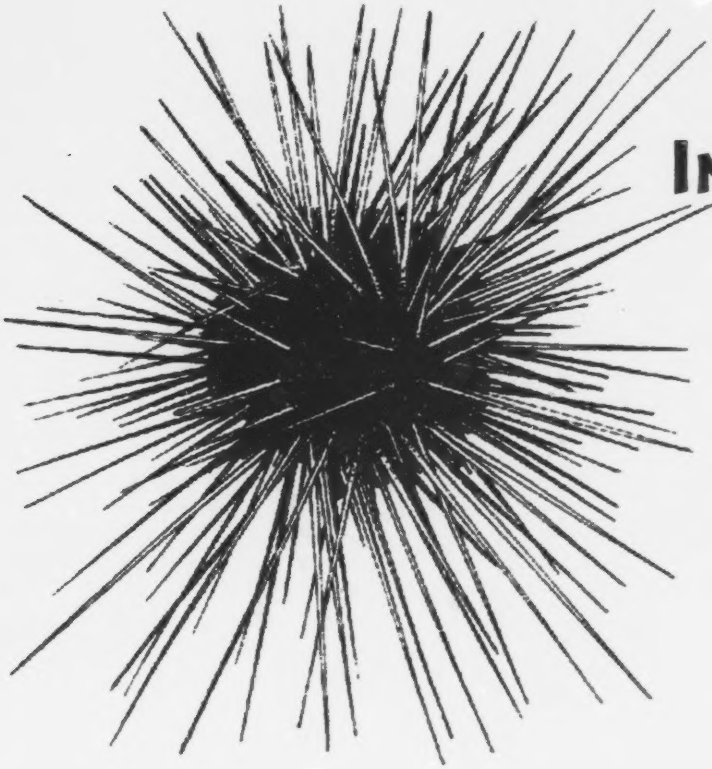
The last section lists resources and publications for further information on environmental education and adaptation.

OTHER RESOURCES AND READINGS

The final section provides two additional readings for those interested in learning more about adaptation. One reading is on the topic of excellence in environmental education materials, which provides in-depth coverage of this topic. The second is an academic paper on lessons learned through exporting environmental education materials from the United States to Honduras.

The last section lists resources and publications for further information on environmental education and adaptation. It incudes listings from Peace Corps' Information Collection and Exchange (ICE) and from other sources. It also includes a section on World Wide Web sites and other addresses for environmental education materials and information.





INTRODUCTION

Peace Corps Volunteers and others who conduct environmental education activities in schools, environmental education centers, parks, and communities are faced with a dilemma. On one hand, environmental issues need to be addressed through education, but locally developed materials either do not exist or are of low quality. On the other hand, environmental educators often have a variety of materials available to them but were they developed in other countries or regions.

Peace Corps resource centers, local agencies and organizations, and international non-governmental organizations (NGOs) are all sources of these non-local materials. Many materials have been thoroughly researched, tested, and evaluated, and include some of the best environmental education materials available anywhere. They focus on learner analysis of environmental issues, are easy for educators to use, encourage integration of activities into the existing curricula or other environmental education programs, and use experiential learning techniques to engage students and participants. Environmental educators welcome these materials in their environmental education programs.

Unfortunately, imported materials are often not appropriate in their original forms. Peace Corps Volunteers teaching in developing countries around the world are acutely aware of the problems associated with using environmental education lesson plans, activities, and books that were developed for use in other countries. For example, materials developed for use in the United States may not address the environmental issues found in developing countries, be culturally appropriate, or recognize the differences in classrooms and teacher/student relationships. They may assume that equipment such as copying facilities are available. Even though locally developed materials may indeed be available, they may not fit a Volunteer environmental educator's needs.

What then is an environmental educator to do? Spend precious time and energy developing new materials, even if materials development is not a priority and time and resources to devote to it are limited? Resign oneself to not doing environmental education because no appropriate materials are available? Use inappropriate materials that may be ineffective or even offensive to the local people?

Often, none of these alternatives is acceptable. What is most needed is a way to review available materials, sort out the best of them, and then thoroughly adapt them so they are relevant to the local setting. Through adaptation, the best parts of good environmental education materials can be retained and still made appropriate to local environmental issues, cultures, and audiences.

What is most needed is a way to review available materials, sort out the best of them, and then thoroughly adapt them so they are relevant to the local setting.

Adaptation can take many forms. Adaptation is not just modifying documents from one country to make them useful in another; it can also include changing the setting of the material from urban to rural, from one region of a country to another, from use in formal education to informal education, from one age group to another, or from large classes to small classes. Adaptation can apply to everything from single lessons and activities to whole books, posters, and activity guides.

Regardless of the type or scale of adaptation, this publication aims to provide guidance on how adaptation can be done well.

- The first few chapters explains the process of adapting materials, which includes review and evaluation, and steps for adapting.
- The second section presents specific examples in which good materials were adapted to be relevant to diverse settings.
- The third part of the manual contains a training design and several training plans that can be used to introduce and practice adaptation techniques in workshops for educators.
- The appendix contains selected readings and resources for further investigation of the topic.

Adapting Environmental Education Materials is intended to complement two other good reference publications for any well-stocked environmental education library. These publications, *Environmental Education in the Schools—Creating a Program that Works!*, by Judy A. Braus and David Wood; and *Conservation Education: A Planning Guide*, by David S. Wood and Diane

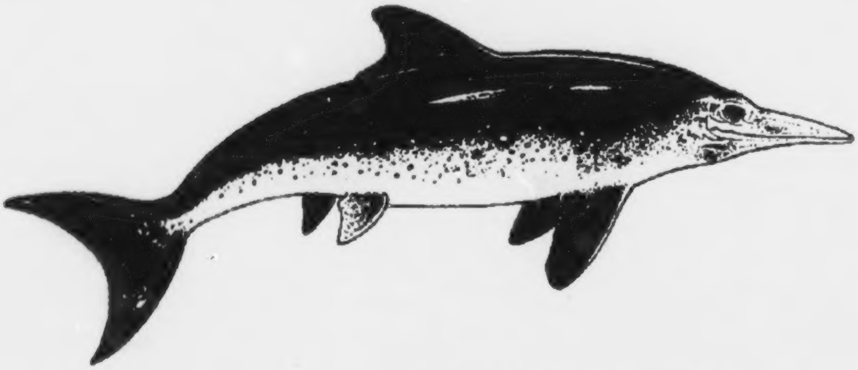
Walton Wood, were originally developed for Peace Corps but are now published and sold commercially and are available to environmental educators outside of Peace Corps as well.

Environmental Education in the Schools—Creating a Program that Works! is a thorough overview of environmental education in schools and provides many useful lessons on a variety of environmental issues using different teaching techniques. We have adapted a couple of these lessons for this manual as examples of what is possible.

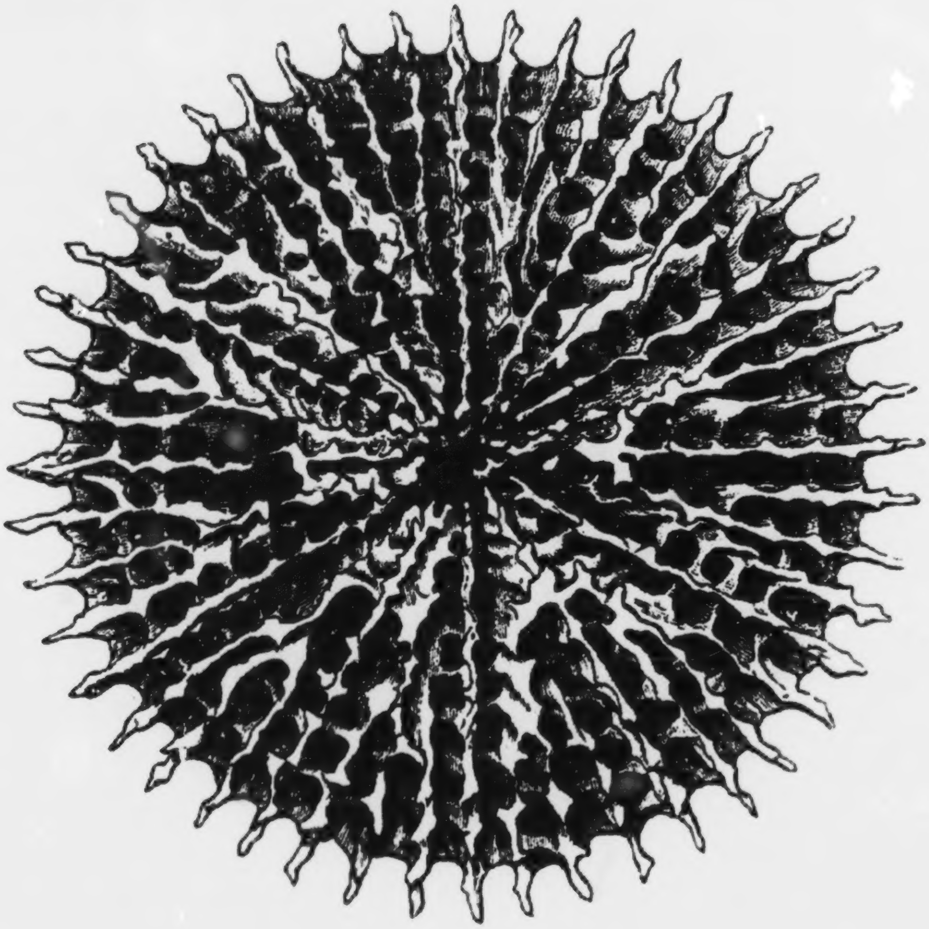
Conservation Education: A Planning Guide is an overview of planning formal and nonformal environmental education programs. The planning process is a fundamental step in understanding the context in which one is working and helps elicit answers to common questions such as the following: What are the environmental issues and problems? Who are the people who contribute to a problem? Who are the people who contribute to solving environmental problems? What tools are appropriate to address the environmental issues and audiences? How do you evaluate and monitor an environmental education program? All of these questions should be considered as a part of the process of adapting and modifying materials. The process has been modified in *Adapting Environmental Education Materials*, but the original version should be reviewed before beginning any adaptation work.

Our hope is that with these three resources in hand, and through a collaborative process of planning the environmental education strategy, finding available environmental education materials, screening for the best of them, and conducting appropriate adaptations, Peace Corps Volunteers and others can get on with the work of carrying out environmental education programs. We hope that this will lead to greater environmental awareness and improved behaviors that will ultimately result in a healthier environment and better lives for all of us.

We hope that this will lead to greater environmental awareness and improved behaviors that will ultimately result in a healthier environment and better lives for all of us.



BEST COPY AVAILABLE



15

WHY ADAPT MATERIALS?

The case study on the following page illustrates how Hungarian educators overcame a problem faced by educators around the world. Because of a lack of locally available environmental education materials, educators identified good materials that were developed for use in another country and through a collaborative process, adapted the materials to make them relevant to the local situation. Thus, they filled a need for environmental education materials to address important environmental problems, and gained some unexpected skills as a result.

Many countries and regions of the world are faced with a chronic lack of environmental education materials. To combat this problem, environmental education materials that have been developed elsewhere (in France, Germany, The Netherlands, United States, and United Kingdom, for example) have been introduced through training or development programs. These materials may take the form of books, lesson plans, activity guides, environmental interpretation resources, or extension service documents. Although the materials may be excellent, they may not be relevant in all communities and environments. In spite of this, educators want to use them in environmental education programs in schools, parks, and communities where materials are otherwise limited or unavailable.

A HUNGARIAN CASE STUDY

Environmental educators in Hungary were eager to have a Hungarian key to freshwater macro-invertebrates because of the growing interest in water quality; interest among educators in hands-on field studies, especially investigating water quality; and the developing network of community groups that were monitoring the quality of local creeks and rivers. Unfortunately, no locally developed key was available to address these needs. The original of *A Key To Freshwater Macro-Invertebrates* was developed in Britain by the Field Studies Council and was identified as an excellent resource, but was obviously not appropriate in its unadapted version because of a difference in educator needs and differences in species found in Hungary and Britain. As a result, the adaptation project was initiated by a Hungarian counterpart of a Peace Corps Volunteer and became a joint effort of Peace Corps/Hungary and two Hungarian environmental education NGOs.

The Peace Corps and the two NGOs are well suited to work together because they have similar goals and operating principles. For example, all three actively promote experiential environmental education and community-based environmental projects. In addition, they all believe in and practice networking to complement their individual efforts and participatory project management. Given this foundation and the need for environmental education materials, the organizations were eager to cooperate to develop an adaptation of the macro-invertebrate guide for Hungary.

The adaptation team went through the following steps to produce a Hungarian version of *A Key To Freshwater Macro-Invertebrates*:

- They identified environmental education program goals and objectives to address important environmental issues and target audiences;
- They identified an excellent educational resource—the original version of *A Key To Freshwater Macro-Invertebrates*—as a tool to meet the goals of the program;
- They identified what needed to be done to produce and distribute the Hungarian version of the key;
- They developed a draft version to test it for strengths and weaknesses;
- They mobilized human, financial, technical, and information resources of the three organizations;
- They applied for and received a copyright waiver to produce 600 copies of the final version of the adapted guide, which would be distributed free of charge;
- They produced the key using shared organizational resources;
- They coordinated the key's distribution by jointly developing a list of appropriate people to give it to and tracked its distribution.

Most of the technical contributions were offered as in-kind support from individuals who were employed by or were volunteering their time to one of the three organizations. Computer experts from one of the NGOs did a brilliant job in maintaining the general layout of the key from the original but made necessary format modifications and translated it into Hungarian. Many people from outside of the three coordinating organizations also contributed to the adaptation. For example, a taxonomist from a local university played a special role in ensuring that the scientific information was accurate and that important Hungarian macro-invertebrates were represented. As a result of this collaborative, participatory process, the final adaptation was a low-cost, high-quality product.

The adaptation of *A Key To Freshwater Macro-Invertebrates* has not only resulted in the production of an important environmental education resource for educators in Hungary, but it also resulted in the development of a variety of unexpected skills among participants. Some of these include collaborative problem solving, analysis, and planning; enhanced technical skills in materials development, editing, and layout; enhanced understanding of macro-invertebrates and their roles as indicators of water quality; and experiences in fund-raising and budgeting. The success of this adaptation has inspired the two local NGOs to undertake similar efforts after Peace Corps leaves Hungary. Their next adaptations will produce keys for animals living in the soil, lichens, and other important indicators of environmental quality.

BEST COPY AVAILABLE

Environmental educators are faced with four choices when there are limited books and resources:

- Do not conduct environmental education programs because no local materials exist;
- Develop new materials that precisely address the local cultural and environmental setting;
- Use materials that have been developed elsewhere, without adaptation;
- Adapt materials that have been developed elsewhere to make them appropriate to the local setting.

In many cases, the urgency of need rules out the "no action" alternative. Environmental problems need to be addressed. Schools, parks, governments, and other organizations are often anxious to have environmental education programs begin because of pressure by curriculum reform efforts, laws, and agreements. At the community level, leaders, teachers, parents, and students see environmental problems around them. These problems may be massive and involve issues of life and death. In other cases, environmental problems affect quality of life. In either case, people are eager to find ways to address these problems through education both in and out of schools. Doing nothing is not usually an acceptable alternative.

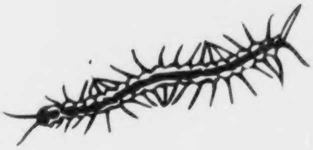
Schools, parks, governments, and other organizations are often anxious to have environmental education programs begin because of pressure by curriculum reform efforts, laws, and agreements.

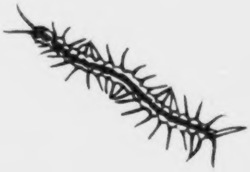
The argument could be made that the best materials are those that are developed to meet the specific needs of the site or community where they will be employed. However, the ability of organizations and individuals to develop new materials may be limited by the following factors:

- Skills and expertise of the environmental educator;
- Time available to devote to materials development;
- Availability of funding and resources.

In addition, there is no guarantee that locally developed materials will be relevant and appropriate, especially if they are developed by people with limited experience in materials development or environmental education.

Unfortunately, introducing materials without adaptation is often an unwise choice as well. Examples exist of imported materials being ineffective and perhaps even detrimental to the goals of environmental education programs. Environmental Educators Sam Ham and Lizeth Castillo report a case where activity guides developed in the United States were translated without first being adapted for use in Brazil. The guides dealt with North American wildlife such as grizzly bears and timber wolves; species that do not exist in Brazil. While the Brazilian children who were exposed to the guides probably enjoyed learning about exotic wildlife, the guides did nothing to contribute to the childrens' knowledge and understanding of Brazilian wildlife, nor did the materials do anything to foster pride in Brazil's wildlife heritage or contribute to wildlife conservation. As Ham and Castillo point out, it seems logical that before





a country can prudently manage its wildlife, its citizens must be knowledgeable about indigenous species.

In a second example, an associate director from Peace Corps/Hungary reported that three wall posters produced in the United States were introduced to Hungarian schools. Colorful wall posters on environmental themes are not widely available in Hungary and teachers welcomed them for their educational value and to beautify classrooms. The American posters provided in-depth information about water usage and factors affecting water quality in an appealing and meaningful way for use in U.S. cities and suburbs. And because water quality is an important issue in Hungary, the posters were translated into Hungarian and reproduced at significant cost. Unfortunately, they were not adapted before they were translated and reproduced, and they retained their focus on U.S. culture and water issues. In addition the important teacher guide on the back of the poster was not included in the Hungarian version. As a result, the posters now decorate classrooms and promote the general theme of protecting water quality, but they are not relevant to Hungarian teachers or students; they are confusing to Hungarians who do not recognize the setting and issues; and they probably do not foster knowledge that will result in better water quality in Hungary.

In spite of the best intentions, in these cases it is clear that the materials were not adapted appropriately to be relevant in the setting where they were being employed. However, many examples of environmental education materials are being adapted from one region or country to another with positive results.

The World Resources Institute (WRI) has worked with partners in 10 countries to adapt and translate the WRI teacher guides. Not being satisfied with simply exporting the teacher guides or translating them, WRI recognized that adaptation was a fundamental part of the process. WRI took a sound and relevant environmental education guidebook and adapted it to include local references and examples (including local flora, wildlife, and environmental issues); to reflect the tone, perspectives, art, and other elements of the countries where the guides are now used. In the United States, the teacher guides are indexed to American voluntary national standards in math, science, and geography, and partners in other countries are encouraged to index them to their national or state curriculum guidelines. Once the guides are adapted they are also translated, if necessary. In some cases, the teacher guides were translated, then circulated in draft to local educators for review and comment. This feedback was used to determine which components of the publication needed be modified and adapted.

Successful adaptation can also occur on a smaller scale. Perhaps most frequently, lesson plans and activities retain their fundamental components, but are adapted to address local issues or needs. This type of adaptation frequently occurs within the United States with materials that have been developed for national use, but need minor adaptation to address regional issues and concerns. For example, *The All New Water*

Review was originally developed for use in rural Wisconsin; but it has been adapted for a variety of settings in the United States from rural to urban with some simple modifications to reflect how different communities obtain and dispose of their household water. When the skit was taken to Botswana and Tonga for Peace Corps Volunteer training, it was adapted each time to reflect the local conditions and vocabulary. In these cases, the framework of the skit remained unchanged but the actors played different roles depending on the water collection and disposal systems. Toilets in the original lesson became outhouses, and river-fed reservoirs for pumping were changed to describe how rain becomes groundwater, which collects in wells. Making an adaptation requires research by students or teachers into which water system is used by a community. Such research can itself be an important part of the environmental education process.

Thus, materials can be brought successfully from one place to another through adaptation. In many cases, this allows environmental education programs to be started or maintained regardless of the lack of locally produced materials. Problems can arise if materials are imported without thoughtful adaptation, but good materials that are adapted well can serve as a solid foundation for an environmental education program.

BEGIN WITH A PLAN

To be successful, adaptation of environmental education materials should be done within the framework of an environmental education program. Developing a program is a critical first step that is often missed by environmental educators. Once a basic plan is ready, materials can be selected and adapted as needed to meet defined goals and objectives. In the cases of Hungarian water and Brazilian wildlife, environmental educators did not seem to have a clear idea of their program goals or of how the materials would be used to help meet those goals. In both cases, educators had identified important environmental problems and materials to address them, but, perhaps they did not think through how the problems should be solved, did not understand the knowledge and values of the people who would be the targets of the education materials, or evaluate the role the materials would play in helping to improve environmental quality. Some up-front planning would have identified the problems associated with the materials and helped lead to their being adapted.

Developing a program is a critical first step that is often missed by environmental educators.

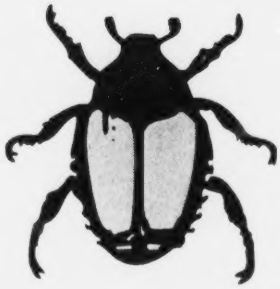
This section provides an overview of planning, but not an exhaustive discussion of it. Several ICE publications are available for more information about planning, including *Conservation Education: A Planning Guide*, by David and Diane Wood; *Team Problem Solving*, by Sandy Pokras; and *Small Projects Design and Management: Training Manual for Volunteers and Counterparts*, by Carol Wzorek.

KEY STEPS IN PLANNING AN ENVIRONMENTAL EDUCATION PROGRAM

1. Identify the people who need to be involved.
2. Identify a community's important environmental issues.
3. Identify potential solutions to the environmental problems and the role of education in solving them.
4. Identify, screen, and select useful environmental education materials.
5. Adapt the materials and test them.
6. Implement the environmental education program.
7. Evaluate the program and the effectiveness of the adapted materials.

IDENTIFYING PEOPLE THAT NEED TO BE INVOLVED

The first step in adapting education materials is to identify the people who will be involved in an environmental education program. Two groups of people need to be considered: Those who can work as a team to develop and implement the environmental education program, and those who live in the community where the program will take place. Community members are critically important to the environmental education program, either because they are contributing or could contribute to environmental problems, or because they could help solve environmental problems. Their needs and perspectives must be considered up front.



ENVIRONMENTAL EDUCATION AS A PARTICIPATORY PROCESS

It is important to establish a team of people who have diverse values and experiences to help develop and implement an environmental education program. Gather a select but diverse group of colleagues including Peace Corps Volunteers from other sectors; teachers; and staff from extension services, parks, resource management agencies, and environmental NGOs. It is also important to have representatives from both the natural resources management and education sectors so that their knowledge and experiences are represented in the program. Keep in mind that a real team includes people who are committed to a common goal. This is the key to successful teamwork; it is likely to be the commitment to the goal that makes the team effective rather than the size of or even the composition of the team.

Once a team is established, use it to identify important potential target groups for the environmental education program. Target groups include people who are causing environmental problems and those who can be problem-solvers, either today or in the future. Don't forget to consider people who may typically be overlooked in planning and program development such as women, out-of-school youth, elderly, and indigenous members of the community. They may be key to a successful team either because their behavior causes environmental problems, or because they hold critical knowledge about the environment and environmental problem-solving. For example, indigenous people may have constraints or taboos on the use of wildlife species, natural resources, and ecosystems that could be important factors in conservation efforts. For example, in Fiji, people have traditionally practiced rotating their fishing areas to protect fish populations. Elderly people, for example, may hold important information about traditional conservation practices that have been lost to younger generations. In many places, women are active users and managers of forest resources, but are often left out of decision making. To be effective, environmental education programs need to target underrepresented groups in order to have an impact on the environment or to solve or prevent environmental problems.

Community members, students, and teachers can be involved in the process of discovering for themselves which people have a relationship with the environment and what that relationship is. *Participatory Analysis for Community Action*, (M0053), is a Peace Corps publication that presents a number of tools and methodologies that can be used to help a community understand its own issues as a foundation to solving community problems. These tools, such as community mapping, seasonal calendars, and daily activity schedules can be used by community members, students, and teachers to discover how people relate to their environment and to identify important environmental issues. Through participatory analysis, community members learn by doing their own analysis, which, in turn contributes to planning an environmental education program.

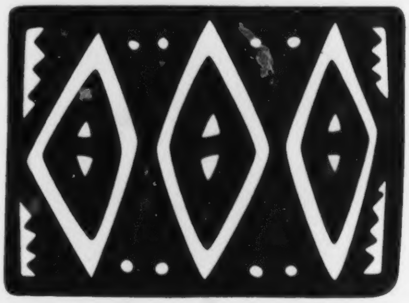
The important environmental issues first need to be addressed before adapting environmental education materials or undertaking an education program.

IDENTIFYING IMPORTANT ENVIRONMENTAL ISSUES

The important environmental issues first need to be addressed before adapting environmental education materials or undertaking an education program. If an education program is not aimed at real environmental problems, you will find resistance to participation and behavior change. Collecting information about environmental problems can be an important part of the educational process. Students and educators can be engaged and serve as experts. Techniques such as community assessment, survey and analysis, oral histories, and student-led scientific investigations can be used to help collect information about environmental problems, land use practices, and community values. For example, using resources from Project GREEN, students around the world are investigating water quality in their local rivers and streams. Armed with solid information they have collected themselves, students decide what the problems are, investigate solutions, and become advocates for change.

Analyzing environmental issues may lead you to the root causes of an environmental issue such as poverty, illiteracy, or poor health. The linkage between an environmental issue and its root causes may justify expanding an education program to include literacy or health care efforts, in addition to an environmental education program that addresses the problem directly. Education programs are often long-term efforts aimed at changing values and practices. Education efforts aimed at literacy or health can yield important short-term results and can serve as the foundation for progress toward solving the environmental problem in the long term. Education efforts can build trust and a sense of accomplishment between a community and educators. Such efforts also address fundamental causes of an environmental problem that need to be solved in order to make real progress toward improving the environment.

Once environmental problems have been identified, the next step is to identify solutions.



IDENTIFYING SOLUTIONS TO ENVIRONMENTAL PROBLEMS AND THE ROLE OF EDUCATION

Once environmental problems have been identified, the next step is to identify solutions. In addition to obtaining expert advice about solving environmental problems, other techniques such as student-led investigations and community analysis can be employed to identify traditional approaches to environmental problem solving. Once solutions are identified, educational goals and objectives can be developed to promote implementation of solutions.

The nature of an environmental education program depends on the target audience and environmental issue you want to address. For example, are you working in a classroom, or with school children in a non-classroom setting, or in a community-based educational setting, or in a park or protected area? Are you using mass media? Are you using the same educational strategies to reach men and women, and girls and boys?

Keep in mind that different strategies may be needed for different audiences. For example, since women's literacy rates are often lower than those of men, it may be necessary to use different means to convey the same message. For an education strategy aimed at village women, visual aids may be more effective than text, local language may be more widely understood than a national language, and existing informal gathering places such as clinics or water sources may be better places to meet women who may be excluded from formal meetings.

If you are working with youth, you may be in either a school or a non-school setting. If you are in a school, it is important to analyze the existing education system to see where your environmental education program can fit in; either as a stand-alone subject or combined with traditional subjects such as math or language. It is also important to understand how to gain access to the formal school system since there are usually restrictions on who can teach within a school. Make contact with appropriate administrators to learn about possible restrictions. You may be more effective by introducing environmental education to teachers through in-service workshops, or to children through school-affiliated, nonformal programs.

COMMUNITY CONTENT-BASED INSTRUCTION AS AN EDUCATIONAL STRATEGY

The term *content-based instruction (CBI)* is used in education to describe a theme-based approach to teaching subject matter. For example, instead of having students practice forming the past tense by conjugating a verb in standardized phrases such as "I threw the ball," they might work with a series of phrases about soil conservation.

Community content-based instruction (CCBI) promotes the idea that content should emerge from and address the needs of a local community. In this way education programs, including environmental education, become tools for community development and promote stronger ties between the community and the classroom.

CCBI includes:

- Participatory approaches to community needs-assessment including student-led and teacher-led investigations;
- Creative lesson plans that incorporate environmental content that addresses a community's environmental problems;
- Small actions and projects by students and their families to address community needs and promote change in knowledge, skills, attitudes, and behaviors;
- Addressing gender issues at all phases of CCBI so that the educational needs of both boys and girls are addressed.

IDENTIFYING, SCREENING, AND SELECTING ENVIRONMENTAL EDUCATION MATERIALS

USE YOUR TEAM TO IDENTIFY ENVIRONMENTAL EDUCATION MATERIALS

We recommend that you apply the energies and knowledge of your environmental education team to the problem of identifying environmental education materials. Brainstorm to develop the largest possible list of potential sources of materials. Encourage group members to identify local, regional, national, and international sources. The list of potential sources should include government and non-government organizations and individuals, and should draw from a variety of technical sectors. Once brainstorming results in a list, develop it further to include contact information such as address, phone, fax or e-mail, contact persons' names, and other pertinent information for each potential source. If appropriate, the list can be divided among the group with all members sharing the responsibility for contacting the source, identifying materials, and getting copies for review.

Once you know your educational goals and objectives, the work of adaptation can begin in earnest. The next steps are to identify the range of environmental education materials available, screen those that may be useful to meet the goals of the program, and select the materials that warrant further effort to adapt. Adaptation can be a time-consuming process depending on the volume and type of materials being adapted. The step of identifying and screening will ensure that the best materials available are selected for adaptation.

IDENTIFYING POTENTIALLY USEFUL MATERIALS

An important step in this part of the process is to identify the range of environmental education materials available and to acquire them for review. Peace Corps Volunteers in Mali who had been developing environmental lesson plans from scratch were happy to discover that many useful lesson plans, student guides, and teacher guides had already been developed by a subregional environmental education project. Once they had identified these materials the Volunteers could focus on making minor changes to them and could quickly put the materials to use.

Search for materials from as many sources as possible including local, regional, and national sources as well as other countries. Start your search with Peace Corps staff, including the Associate Peace Corps Director (APCD) for your project and resource center directors. APCDs from environment sector projects are the logical first point of contact, however, APCDs from other projects such as health, education, water and sanitation, and agriculture may have information and materials that could be used with minor adaptations. For example, through the planning process, sustainable agriculture or water quality in your community may have been identified as a critical environmental issue. The agriculture and water and sanitation sectors would thus be critical places to begin the search.

Your Peace Corps in-country resource center (IRC) and the manager who runs it are also important sources for environmental education materials. Some countries may not have an IRC manager, but materials and books may still be held in a central location. It takes effort to sort through shelves, but the effort often reveals a variety of useful materials, including lesson plans that were developed by previous Peace Corps Volunteers. APCDs and IRC managers can also help Peace Corps Volunteers access the Information Collection and Exchange (ICE) system within Peace Corps, through which Volunteers can acquire materials and books from around the world.

A good starting point for international resources is the ICE Catalog. Additional information can be found on pages 481-494 of *Environmental Education in the Schools-Creating a Program that Works!*, by Judy Braus and

David Wood. To those with Internet access, this publication is available on the Peace Corps World Wide Web site at http://www.peacecorps.gov.

If you have access to the Internet, you can tap into a fantastic array of environmental education materials. A good reference guide for using computers in environmental education is a publication of the EE Toolbox, *Using Computers in Environmental Education: Interactive Multimedia and On-Line Learning*, by W.J. "Rocky" Rohwedder and Andy Alm. For World Wide Web sites and addresses see the Other Resources and Readings section of this manual.

SCREENING POTENTIAL ENVIRONMENTAL EDUCATION MATERIALS THROUGH A QUICK REVIEW

(Adapted from *Evaluating Environmental Education Materials*, by Leeann Tourillott and Peggy Britt.)

Once you have collected a variety of potentially useful materials, the next step is to identify those that meet the goals and objectives of the environmental education plan. A quick review can help eliminate materials that are not appropriate and leave those that may be useful. To narrow the search it may be useful to do a quick review beforehand.

If you have access to the Internet, you can tap into a fantastic array of environmental education materials.

Potential questions to ask during a quick review include the following:

1. Do the materials address priority environmental issues or can they be adapted to address them?
2. Are the materials appropriate for the audience that is the target of the educational strategy? Can they be adapted to be appropriate?
3. Are the materials appropriate to the learning setting (i.e., classroom, outdoor center, informal gathering, time available)? Can they be adapted to be appropriate?
4. Do the materials provide sufficient instructor information so that they are understandable and easy to follow?

Materials can be rated against these criteria using the Quick Review Form that follows, answering with a Yes or No, or rating them on a numerical scale. Publications receiving the highest rating would be retained for further review.

QUICK REVIEW FORM

Title of material	Focuses on desired issue? (Y/N)	Appropriate for the selected audience? (Y/N)	Appropriate for the educational setting	Understandable able and easy to follow? (Y/N)	Evaluate further? (Y/N)

For the full form, see page 120.

USE A TEAM TO EVALUATE ENVIRONMENTAL EDUCATION MATERIALS

A quick review should be conducted as a group process if possible, using your environmental education team or a subgroup of interested people. A team can sort and select materials for adaptation by conducting a quick review using some key questions. Each educator independently reviews and rates the materials. The ratings are then compared and discussed and a consensus reached among the group about which materials to evaluate further. This allows you to bring the best minds to work on the task and builds commitment from key partners and collaborators. Such commitment will aid the eventual implementation of an environmental education program. Making evaluation a group effort also provides an opportunity for educators to become familiar with the materials, which will be critical to their eventual use of them in their own programs.

CONDUCTING AN IN-DEPTH EVALUATION TO IDENTIFY EXCELLENT MATERIALS

Once you and your team have done an initial screening, subject the selected materials to a more in-depth evaluation to identify the best ones to adapt. Evaluating is critical in the field of environmental education today since so many materials of such varying quality are available from so many sources. To respond to this issue, the North American Association for Environmental Education, the U.S. Environmental Protection Agency, the World Wildlife Fund, and other organizations recently convened a group of environmental education leaders to draft guidelines for identifying high-quality materials. The resulting publication, *Environmental Education Materials: Guidelines for Excellence*, was used as the basis for the evaluation criteria presented below. Parts of the publication have been reprinted in the Other Resources and Readings section of this manual. We encourage you to read the appendix to learn more about how to recognize excellence in education materials. Another important resource is *Evaluating Environmental Education Materials*, by Leeann Tourillott and Peggy Britt, in the EE Toolbox. It presents similar evaluation criteria that are a useful complement to those presented here.

Excellent environmental education materials:

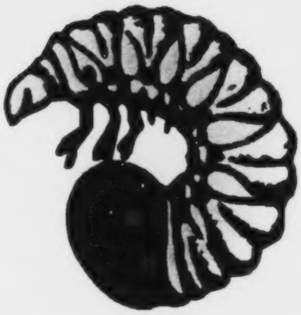
- Are fair and accurate;
- Foster awareness and understanding of the environment;
- Emphasize skill building;
- Promote environmental problem solving and action;
- Rely on sound instructional techniques;
- Are well designed and easy to use.

FAIR AND ACCURATE MATERIALS describe environmental problems, issues, and conditions accurately, and present a variety of perspectives. Facts are well documented and theories about environmental problems and issues are sound. Sources are clearly referenced and materials have been subjected to review by a range of subject matter experts. Fair materials offer a range of perspectives and viewpoints, and don't present opinion as fact. Fair and accurate materials emphasize learners exploring environmental problems from different perspectives and forming their own opinions on the basis of inquiry. Fair materials present perspectives from a wide variety of people and cross sections of society, rather than from the point of view of one group (or the bias is declared).

Materials that foster awareness and understanding of the environment address environmental concepts, conditions, and issues; as well as feelings, values, attitudes, and perceptions at the heart of environmental issues.

MATERIALS THAT FOSTER AWARENESS AND UNDERSTANDING of the environment address environmental concepts, conditions, and issues; as well as feelings, values, attitudes, and perceptions at the heart of environmental issues. For example, activities encourage participants to clarify their own values as they relate to environmental issues. Excellent materials focus on concepts from the environmental and social science fields, rather than on facts. Fostering awareness and understanding means presenting environmental issues in their social and economic contexts, as well as presenting information about the physical aspects of the environment. In order to foster awareness and understanding, excellent materials present environmental problems and issues at various scales, from short-term to long-term and from local to global.

Environmental education materials that focus on building skills for problem solving promote development of critical and creative thinking such as drawing conclusions based on research and study. Excellent materials also emphasize applying skills and information to problem solving and action through civic responsibility, enhancing learners' knowledge and personal skills, and their assessment of environmental issues. For example, activities help participants gain communication, group leadership, and other interpersonal skills that are necessary to become involved in finding solutions to problems. Excellent materials encourage learners to take responsibility through citizen participation and help them to see ways to bring about change.



EXCELLENT MATERIALS ARE INSTRUCTIONALLY SOUND. Where possible and appropriate, learning should be based on learners' interests and abilities to construct knowledge through research, discussion, application, and practical experiences. Excellent materials encourage educators to experiment with a variety of instructional methods, including role playing, demonstrations, field studies, lectures, and creative expression. Excellent materials emphasize the interdisciplinary nature of environmental education and present options for integration with other technical areas. Such materials present clear goals and objectives and methods of assessing learner progress.

EXCELLENT MATERIALS ARE DESIGNED WELL AND ARE EASY TO USE. Information is presented clearly and logically, with a user-friendly format and layout. They are accompanied by instruction and support, and can be adapted to different situations. Another important component of usability, especially for teachers in a formal education system, is the connection between the materials and curriculum requirements.

EXCELLENT ENVIRONMENTAL EDUCATION MATERIALS ADDRESS DIFFERENT LEARNING STYLES

David Kolb and Bernice McCarthy are two among many educators who have promoted the idea that effective teaching recognizes that people have different learning preferences or styles. These learning styles include the following:

- Learning by feeling (talking, discussing experiences, and exchanging feedback);
- Learning by watching and listening (observing and judging carefully);
- Learning by thinking (analyzing and evaluating rationally);
- Learning by doing (engaging in projects, experimenting, and taking risks).

To help educators address different learning styles, McCarthy developed a four-part lesson planning model called the 4MAT System. The 4MAT model includes four segments, one each for motivation, information, practice, and application. Excellent environmental education materials will incorporate different types of teaching methods to reach learners who have different learning styles. The 4MAT lesson planning model can be used in adapting materials either at the level of individual lesson plans for theme-based units of instruction, or for long-term planning. Although 4MAT was developed primarily for use in schools, it can also be applied to teaching adults or children in informal settings. For more information about 4MAT and learning styles, see the following ICE publications: *Experiential Learning: Experience as the Source of Learning and Development*, by David A. Kolb; *The 4MAT System: Teaching to Learning Styles with Left/Right Mode Techniques*, by Bernice McCarthy; *Nonformal Education Manual*, by Helen Fox; and *Teaching English as a Foreign Language to Large, Multi-Level Classes*, edited by Mary Jo Larson.

BEST COPY AVAILABLE

RECOGNIZING BIAS IN ENVIRONMENTAL EDUCATION MATERIALS

(Modified from the EE Toolbox publication
Evaluating Environmental Education Materials,
by Leeann Tourillott and Peggy Britt.)

One problem with many environmental education materials is that they present biased information and lead educators and learners to conclusions and actions based on the values of the persons who developed the materials. We each have our own biases that were developed through our life experiences; and we are each confronted by bias in many forms every day in textbooks, posters, curriculum guides, and television, among other sources. Industrial and environmental groups are often accused of presenting slanted information; in fact, most forms of informational media contain some type of bias. However, many forms of bias are subtle, depending on how "facts" are determined and presented. It is impossible to expect that materials will contain no bias, and an important part of the learning process is learning to recognize and address bias.

The evaluation criteria presented on page 21 should help you discover whether or not materials are biased. If your evaluation leads you to believe that environmental education materials are biased, consider the following options:

- Do not use the material;
- Balance the biased materials with other materials;
- Modify materials to reduce bias;
- Identify the bias, discuss it, and analyze it through your environmental education program.

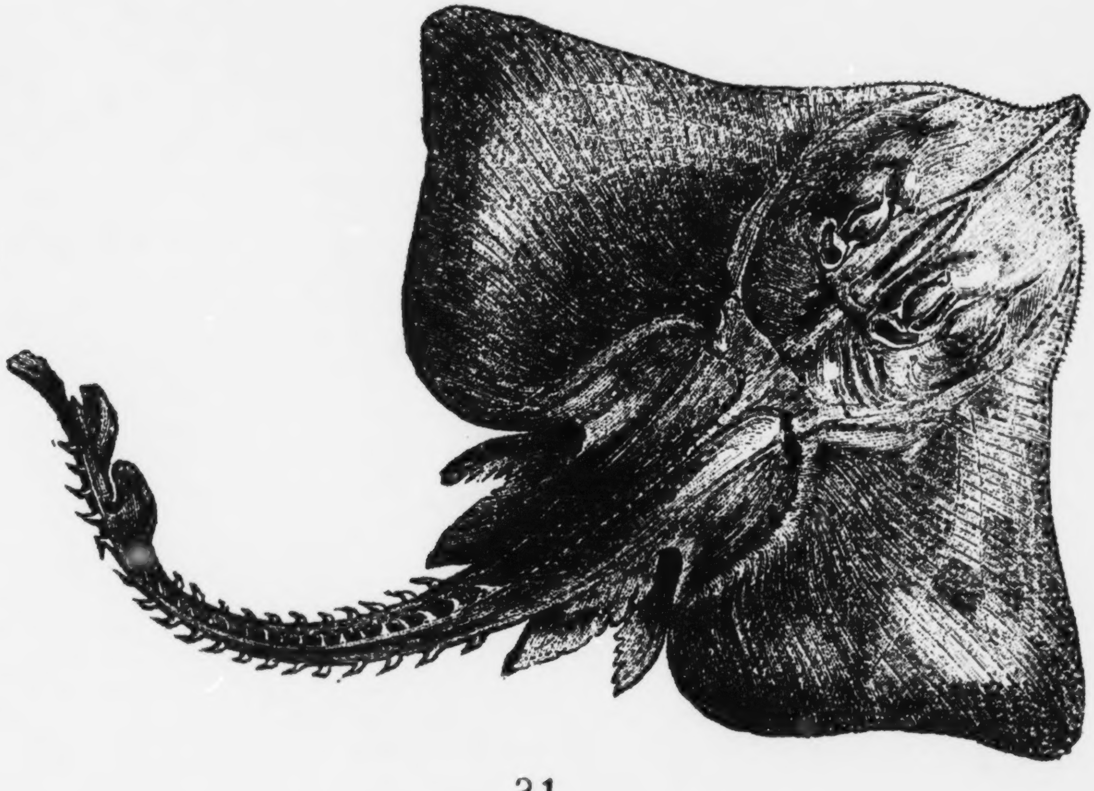
Identifying bias is a critical step in evaluating materials, although eliminating biased materials is not always necessary. In fact, the directed use of biased materials can help promote understanding of what bias is, how people are influenced by bias, and how peoples' biases are reflected in their positions on environmental issues. The publication *Evaluating Environmental Education Materials* contains a training session on how to discover and overcome bias. This is a useful exercise to incorporate into a teacher training workshop to help educators understand the role of bias in environmental issues.

BEST COPY AVAILABLE

> ***Once basically sound materials are selected using these guidelines the adaptation process can focus on the best materials of those that are available.***

Rate the materials against guidelines for excellence, if possible, by convening a small group of environmental education specialists, general educators, and other key people. Each person works individually to review the materials and rates them against the guidelines. The group reconvenes to discuss and agree on the best of the materials, and reviews the strengths and weaknesses of each. An evaluation form, such as Evaluating EE Materials for Excellence, presented on page 21, could serve as a guide for reviewers. Prior to this work, group members should review the environmental education plan and the overall objectives of the environmental education program so that the materials can be rated for their effectiveness within the context of long-term goals and objectives. This is an informal, indirect method for evaluating materials. Other evaluation ideas can be found in *Evaluating Environmental Education Materials*, by Leeann Tourillott and Peggy Britt, which is found in the EE Toolbox.

Many materials obviously will not meet all of the standards for excellence, however, the standards can serve as rating criteria. Those that meet the standards can be kept for further adaptation. Once basically sound materials are selected using these guidelines the adaptation process can focus on the best materials of those that are available. Applying standards of excellence to your materials can also serve as a useful starting point for the actual work of adaptation, because they can point out weaknesses in the materials that can be addressed through adaptation.



EVALUATING AN EE DOCUMENT FOR EXCELLENCE

Rate as: "1" Does not meet criterion
"2" Partially meets criterion
"3" Meets criterion
"NA" Not applicable

Title: ______________________________

Name of Reviewer: ______________________________

Key Characteristic	Criteria	Rating	Comments and Adaptation Issues
Is it fair and accurate?	Is it factually accurate?		
	Does it present balanced points of view?		
	Does it promote open inquiry?		
	Does it reflect a diversity of perspectives?		
Does it foster awareness and understanding of the environment?	Does it acknowledge feelings, experiences, and attitudes as factors in environmental issues?		
	Does it focus on concepts rather than facts?		
	Does it provide an economic and social context for environmental issues?		
	Does it explore environmental issues from different scales, including long-term and short term, and local to global?		
Does it emphasize skill building to enable learners to prevent and address environmental issues?	Does it promote the development of critical and creative thinking skills?		
	Does it explain how to apply these skills to issues?		
	Does it foster skills in how to take action?		

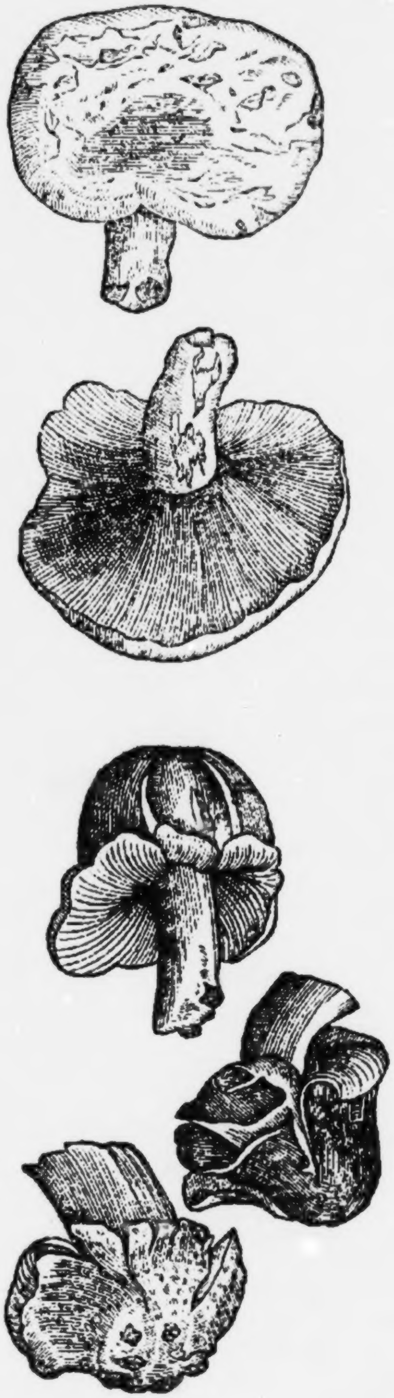
BEST COPY AVAILABLE

Key Characteristic	Criteria	Rating	Comments and Adaptation Issues
Does it promote environmental problem solving and action?	Does it promote personal responsibility?		
	Does it help learners see ways they can influence the outcome of the situation?		
Does it rely on sound instructional techniques that create an effective learning environment?	Is it based on a learner's interest and ability to construct knowledge through research, discussion, application, and practical experience?		
	Does it present a variety of instructional methods to address different learning styles?		
	Is it relevant to a learner's everyday life?		
	Does it encourage learning to take place beyond the boundaries of a classroom or educational center?		
	Is it interdisciplinary?		
	Does it present clear learning goals, objectives, and measurements of success?		
Is it well designed and easy to use?	Is the overall structure of the material logical and clear?		
	Is the overall format and layout clear?		
	Is it accompanied by institutional support and instruction in its use?		
	Is it adaptable to a variety of learning situations?		
	Does it fit within curriculum requirements and/or environmental education program goals?		

Do you recommend that this material be retained for possible adaptation?

BEST COPY AVAILABLE

COPYRIGHT ISSUES



Many education materials are protected by copyright laws and international copyright treaties. In most cases, this means that the owner of the copyright—usually the author or publisher—has the exclusive right to reproduce, distribute, perform, display, or license the work. Although the owner of a copyright may license—or permit another person to use—any or all of his or her exclusive rights, any person who uses a copyrighted publication without express written permission from the copyright owner may be liable for violation of the copyright.

Copyright protection of a publication or materials is often indicated by the copyright symbol, ©, the letter "c" with a circle around it, followed by the date of copyright and the name of the owner of the copyright. Copyright protection may also be indicated by the term "Copyright," the phrase "All rights reserved," or any other term, phrase, or statement that indicates that the owner has retained rights to use the publication.

Important Note: under United States law, it is no longer necessary to display the copyright symbol or print a copyright statement in order to protect the owner's rights. Thus, a person may retain copyright protection on a publication without specifically stating that the publication is protected.

In order to reproduce, distribute, perform, display, license, or otherwise use material or a publication that has copyright protection, one must receive express written permission from the owner of the copyright. This may be done in one of two ways.

First, a copyright owner sometimes grants express written permission to use a publication for particular purposes in the copyright statement itself. If a copyright owner grants express written permission to use the publication in the copyright notice, a person may use the publication in the ways that the owner has stated without further permission from the owner.

For example, a copyright notice may read:

Copyright 1994. Educators may photocopy these materials for the non-commercial purpose of educational advancement.

In this case, an educator may photocopy the publication for non-commercial, educational purposes without further permission.

Second, a copyright owner may grant express written permission to use a publication for a particular purpose in a letter, contract, licensing agreement, cooperative agreement, or other document in response to a request. A request to use material that has copyright protection should be in writing. It should state specifically what portions of the material the requester intends to use, in what ways the requester intends to use the material, and whether the material will be used in a document for distribution without charge or for non-commercial purposes.

In many cases a cooperative agreement is a viable alternative. The Centre for Environmental Education (CEE) in India developed a cooperative agreement with the National Wildlife Federation, which allowed CEE to use any material from *NatureScope* either directly or through adaptation. One agreement covered an entire set of materials, which could then be used or adapted to meet CEE's needs. The World Resources Institute encourages the adaptation of its teachers guides through cooperative agreements with organizations in other countries. These agreements require organizations that adapt materials to maintain the accuracy of the original data (WRI reviews manuscripts and final drafts) and to conduct a wide-ranging review process among local experts and educators. If both organizations are willing to enter a cooperative agreement, this offers the adapting organization the benefit of a long-term partnership with the original producer and access to the expertise and other resources that resulted in the development of the original publication. A cooperative agreement can also lend the original producer the benefits and experiences of the adapting organization. If you are contemplating this approach, be sure to work closely with your APCD to ensure that your efforts are compatible with the policies and objectives of your Peace Corps program.

The World Resources Institute encourages the adaptation of its teachers guides through cooperative agreements with organizations in other countries.

Individual copyright owners often have their own standards for granting permission for use. Moreover, it is important to recognize that securing permission often takes multiple contacts, and it may be difficult to secure permission without a telephone call to the copyright owner to discuss plans for adaptation and distribution. However, making this personal contact can often result in more favorable arrangements with the publisher.

For example, the North American Association for Environmental Education recently worked with a large publishing company to secure permission to translate and reprint some environmental education publications that were covered by a copyright restriction. The standard fee was $2,000, plus a 5 to 8 percent commission on each copy of the translation sold for commercial profit. Since the materials were to be used primarily in developing countries and distributed free of charge, the publisher reduced its fee to $500 and waived its commission.

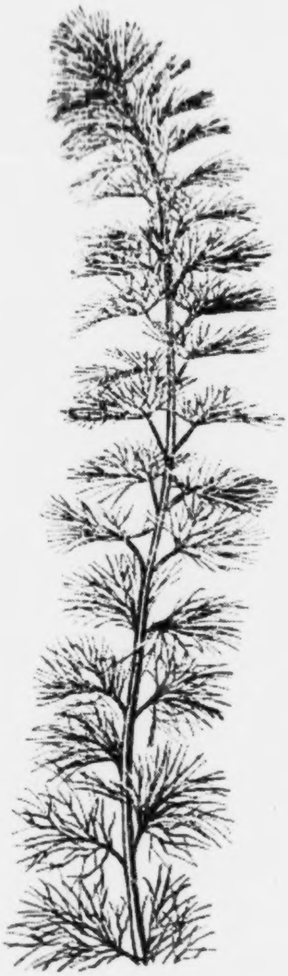
Regardless of whether a particular publication enjoys copyright protection, the author, publisher, or originator should always be recognized out of professional courtesy in conformance with standard bibliographical and citation style.

Finally, it is important to note that copyright law may vary from country to country, and, depending on the circumstances, a particular use of a publication may qualify as an exception to the general copyright rules. If you have any questions about copyright law and its applications, you should contact Steve Schwinn, Assistant General Consul, (202) 692-2150.

ADAPTING AND TESTING MATERIALS

Once you have evaluated materials and selected the activities or resources you intend to use in your environmental education program, you can begin adapting them. You may encounter a number of problems if you plan to use materials that were written for use in a different country or region. During a recent Peace Corps conference for environmental educators from central and Eastern Europe, participants discussed the kinds of issues that can arise when importing materials and generated the following list:

- Materials do not refer to local issues and organizations;
- Information may be overwhelming to people with a limited background in the subject area;
- Materials may be in English or another language. How can they be translated?
- A country may have a predominant learning style that differs from the country in which the materials were developed; A particular teaching methodology may be new and unfamiliar to the intended audience (e.g., cooperative learning);
- How can materials be adapted to older or younger age groups?
- Who will pay for translation and adaptation?
- What are the copyright restrictions and how should they be addressed?
- How should the materials reflect differences in culture, dress, and style?
- Access to technologies to deal with environmental issues varies within and among countries;
- The visual presentation of people and objects in the materials need to be addressed: social differences, community design, clothing, houses, physical features of people;
- Values about how we relate to the environment vary from one location to another.



To help address these issues, keep in mind the following principles for adaptation:

1. Adapt materials on the basis of a sound environmental education plan that has clear objectives for what you hope to accomplish.
2. Collaborate in the following ways:
    - Build partnerships with people and organizations who can support your efforts;
    - Build on the knowledge of others;
    - Find experts—make a list of possible sources and contacts, and follow up with meetings;
    - Promote interdisciplinary links among technical sectors and between educators and scientists.
3. Identify, screen, and select the best materials to adapt. Conduct an extensive search for resources, screen them to find materials that will most likely meet your needs, and then select those to work on further.
4. Conduct an in-depth evaluation of the materials you select to find those with the highest quality and that will best meet the needs of your program. Adaptation takes time and energy, and you want to adapt only the best materials that are available.
5. Give credit where credit is due by recognizing the original authors and obtaining clearance to use copyrighted materials.
6. Approach adaptation systemically once materials have been selected. The steps in this systematic approach include the following:
    - Identify adaptation issues.
    - Identify specific steps to carry out the adaptation and the persons who will be responsible for each step.
    - Complete a draft version of the adaptation and test it.
7. Build in an evaluation and test again using the following criteria:
    - Incorporate a review of the adaptation in draft form;
    - Test materials before finalizing them;
    - Do not make a large financial investment until materials have been tested.
8. Recognize that adaptation is a question of scale but that the concepts of adaptation apply throughout the process whether a document is a single lesson plan or a whole book.

9. Be aware that unadapted materials in the wrong setting can be demoralizing and unproductive. Your efforts to adapt good materials to your community are worth your effort.

A SYSTEMATIC APPROACH TO ADAPTATION

First define the steps that need to be taken and then systematically follow through the process until the adaptation process is complete. Dividing the job into small tasks that can be taken on one at a time and weaving them together to make the end product makes a huge job more manageable. Each adaptation must follow its own process, but for many adaptations, the steps in the following box will be a logical approach.

A SYSTEMATIC APPROACH TO ADAPTATION

STEP 1

Identify your adaptation partners and apply the team approach to adaptation.

STEP 2

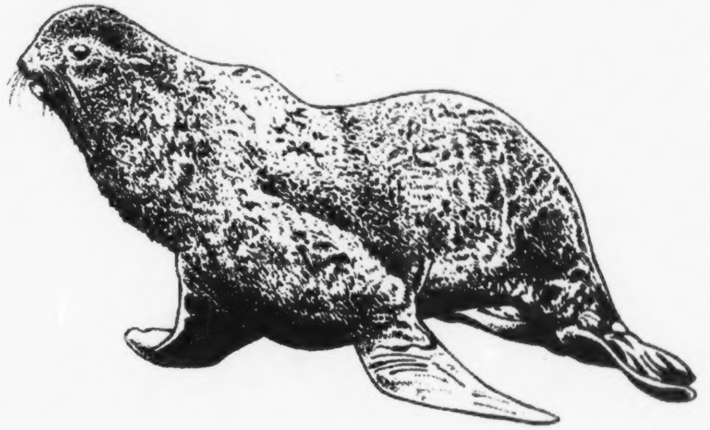
Identify adaptation issues that need to be addressed.

STEP 3

Identify the specific steps that need to be taken and who will be responsible for taking them, deadlines for completion, and sources for additional resources.

STEP 4

Complete a draft version of the adaptation, share it, use it, and test it.

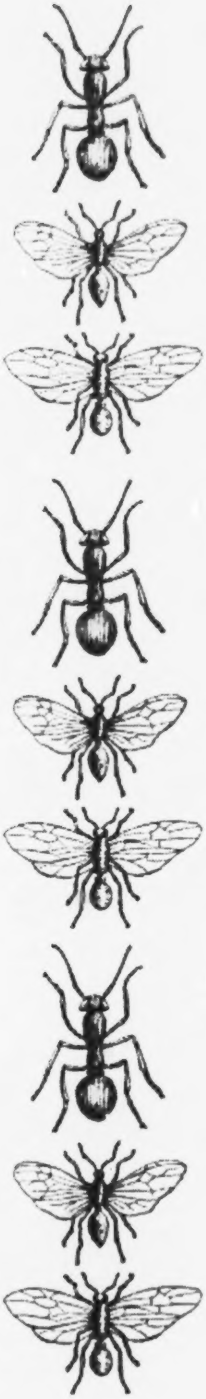


STEP 1.
IDENTIFY YOUR ADAPTATION PARTNERS AND APPLY THE TEAM APPROACH TO ADAPTATION.

Put together a team, which may be large or small, depending on the size of the job. The team can comprise the same people who helped in planning, materials collection, and evaluation; or you may have a different group of people who are interested in the adaptation process itself. Try to convene a diverse group of people who have a variety of perspectives in order to tap into a wider network of resources, knowledge, and experience.

STEP 2.
IDENTIFY ADAPTATION ISSUES AFTER CAREFULLY REVIEWING THE ACTIVITY OR ENVIRONMENTAL EDUCATION MATERIALS.

You may conduct an "armchair" review, in which your team or other educators read and comment on the types of things that need to be addressed through adaptation. Or your review may take the form of a field review by educators who use the materials in a learning setting, and make note of adaptation issues that arise. WRI and other groups have translated unadapted materials and then distributed them to teachers for evaluation. This process identifies adaptation needs.



CEE in India collaborated with the National Wildlife Federation in the United States to adapt *NatureScope's Amazing Mammals* and, with WRI, a teacher's guide to biodiversity. Educators at CEE reported that adaptation issues fell within one of several categories:

- **ENVIRONMENTAL ISSUES UNDER DISCUSSION** (some were relevant, some were not and needed to be replaced);
- **EXAMPLES** (examples from India could be substituted where scientific facts and concepts remained the same); and
- **EDUCATIONAL METHODOLOGIES USED** (the U.S. version of *NatureScope* assumes that teachers and students have access to libraries and resources that teachers in India do not have, so that much more background information was included in the *Amazing Mammals India* adaptation than was included in the American version.)

WRI has been involved in a number of adaptations of teacher guides and has found that adaptation issues fall within one of three categories:

- Examples and references need to be localized;
- Materials need to be made culturally relevant (including the look, artwork, and perspective);
- Materials must fit within the local educational structure. (American materials are indexed to voluntary national standards, adaptations for other countries are indexed to national or provincial curriculum guides.)

Educational models used in one country or setting may not be applicable in another setting without first being adapted. For example, interpretive programs developed for use in the United States may not be directly applicable to developing countries because the audiences are different. Working with national curriculum standards is another important issue to consider. Environmental educators who think about adapting and introducing new materials must consider the implications for teachers who must work within an inflexible curriculum. This may require making a strong connection between the environmental education materials and the formal curriculum.

The relevance of the topics to be included in the environmental education program must also be verified. In general, there must be practical relevance to initiate a change in behavior, either through economic advantage or recognizable improvement in standard of living. In many countries the priority is not environmental attitudes but environmental results. Attitudes and awareness are means to an end, not ends in themselves.

Cultural issues need to be understood before adaptation can take place. Examine the following questions: How are environmental issues viewed by a particular culture? Is it possible to teach environmental education concepts without damaging a learner's self-esteem? What is the role of an educator concerning values in the classroom or educational setting? And perhaps the most important is, what partners can be enlisted to help environmental educators understand and address cultural issues when reviewing materials and making adaptations?

Several dimensions of language need to be considered. Translation from one language to another is often needed. Literal translations are usually not adequate; text must be modified to capture language nuances that don't translate literally from one language to another. The rule of thumb is that translators should translate from a second language into their native language. Since this is not always possible, a native speaker should review a translation after it has been completed to ensure that the translation was done well.

Text must often be modified to fit the reading level of the target audience, or modified for use with illiterate groups. Language also includes the format or style in which information is presented. An informal or "chatty" style may not be appropriate and may need to be rewritten. Text-dense materials may need to be modified to include pictures, charts, or other visual aids that convey information to people who will read materials in a language that is not their first language.

Text should be simplified for use in language classes or where English is not students' first language. The guidelines in the following box can be applied to simplify text.

GUIDELINES FOR SIMPLIFYING TEXT

1. Vocabulary:
    - Simplify
    - Identify new words and explain them
2. Idiomatic expressions:
    - Eliminate them all together
    - Identify new ones and explain them
3. Sentence length:
    - Reduce
4. Paragraph length:
    - Reduce
5. Grammatical structures:
    - Simplify
    - Identify new ones and explain
6. Information:
    - Eliminate unnecessary details
7. Abstract ideas:
    - Replace with concrete actions
8. Total length:
    - Shorten or lengthen, depending on the purpose of the lesson

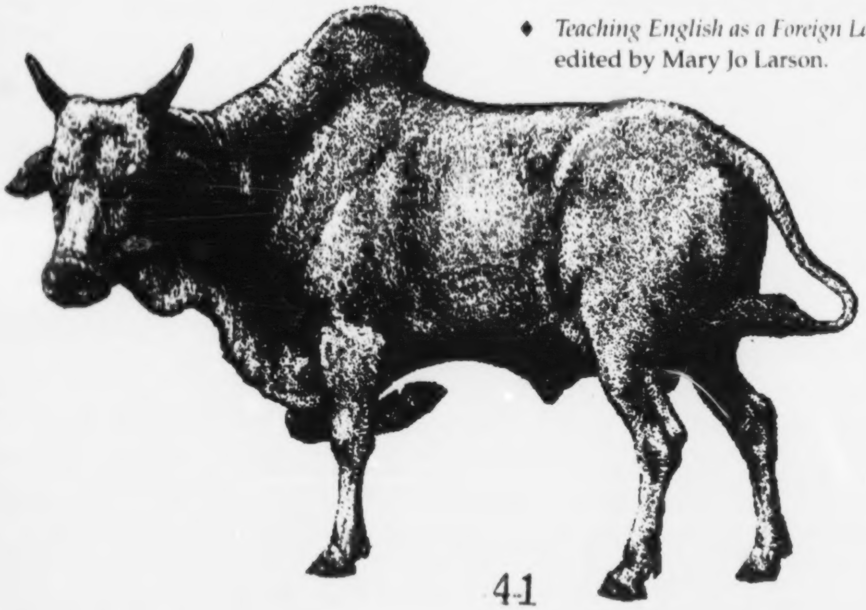
Teaching methodologies need to be evaluated so that materials will be acceptable within a new educational context. Teachers and learners must be prepared to use new techniques such as demonstrations, discussions, and experiential learning, or appropriate background information needs to be included in the material. In some cases, adaptation includes introducing materials through training programs when new methodologies are presented. Methodologies also need to fit into a local reality. Consider how much time is available to teach new concepts or information, the facilities that are available, and whether an information base is accessible to educators and learners. Because teachers may lack reference materials, some adaptations of classroom activities have included additional pages of background information on the subject area.

Teachers and learners must be prepared to use new techniques such as demonstrations, discussions, and experiential learning, or appropriate background information needs to be included in the material.

The adaptation possibilities that follow list eight issues that may arise when adapting environmental education materials. Several possible actions are presented to address each issue and make the material relevant and useful. Use the Adaptation Issues Form as a tool to help you focus your review, and note issues and possible solutions.

Some excellent resource books that describe ways to conduct environmental education and interpretation programs in developing countries are available to Peace Corps Volunteers and staff through ICE or your local IRC. Review these books to obtain more ideas about adaptation issues and solutions:

- *Nonformal Education Manual*, by Helen Fox
- *Teaching Conservation in Developing Nations*, by Judith Brace, Ralph R. White, and Stephen C. Bass
- *Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets*, by Sam H. Ham
- *Teaching English as a Foreign Language to Large Multilevel Classes*, edited by Mary Jo Larson.



ADAPTATION POSSIBILITIES

If...	Consider...
1. Examples are not appropriate to your locale	a. Substituting local species of plants and animals. b. Including local environmental issues, controversies, and people. c. Including artwork or photographs from your country or region.
2. The reading level is too difficult	a. Shortening sentences, simplifying grammar, and substituting simpler words. b. Introducing new words and telling students what to read for prior to their reading. c. Eliminating idiomatic language and scientific jargon.
3. Activities are too passive	a. Dividing material into parts and assigning small groups to make presentations. b. Introducing material with questions to be answered through reading or listening. c. Turning the material into a discovery or problem-solving lesson.
4. Activities don't fit the classroom subject	a. Converting environmental data into math problems. b. Assigning students measurement and data collection tasks and analyzing data in class. c. Using environmental topics to teach processes. d. Analyzing the curriculum to find connections to the topic area. e. Adding reading or writing exercises as prework or postwork to environmental education demonstrations or activities.
5. Material is biased	a. Having learners listen to, read, or discuss materials from different perspectives (e.g., community women, extension agents, farmers, children). b. Having learners research and write about the same problem from different perspectives.
6. Methodologies are not usable in your situation	a. Presenting the same material in a different way. b. Substituting simpler, locally available materials. c. Using one written copy rather than handouts by: • Reading aloud • Dictating main points • Outlining main points on a blackboard for students to copy • Having students work in groups to share limited copies.
7. Learners are illiterate	a. Transforming written ideas into simple pictures. b. Adding visual aids and demonstrations to the material. c. Modifying the material for use on radio or other mass media, if these are important channels of information in your community. d. Converting material into stories, songs, puppet shows, and other forms of popular entertainment to convey environmental messages.
8. A model does not fit your reality	a. Analyzing the differences to see if a model is transferable. b. Changing the focus from theory and information to demonstration and application for people living at a subsistence level by including information about health, literacy, agriculture, and forestry. c. Supplementing activities with written background information on the topic area, if reference books and information are limited. d. Finding ways to do without electricity, running water, and copying facilities, if they are not available.

ADAPTATION ISSUES FORM

Name of Activity or Lesson: ____________________

Name of Reviewer: ____________________

Adaptation Issue	**Adaptation Action Needed**
Examples are not appropriate	
Reading level is too difficult	
Activity is too passive	
Activity does not fit classroom subject	
Material is biased	
Methodologies cannot be used in your situation	
Learners are illiterate	
Model does not fit your reality	
Other	
Other	

STEP 3.
IDENTIFY SPECIFIC STEPS TO PREPARE A DRAFT ADAPTED VERSION OF THE MATERIALS.

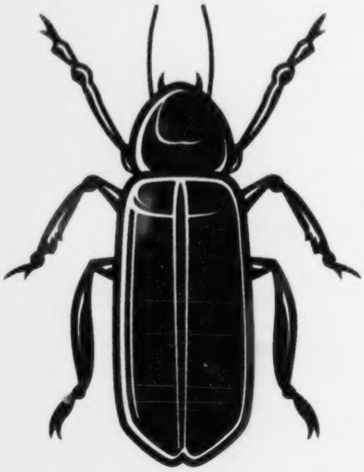
Management experts suggest using an action matrix to help identify and accomplish the steps, distribute responsibility, establish deadlines, and identify resources. The action planning matrix that follows was modified from one that appears in *Team Problem Solving: Solving Problems Systematically*, by Sandy Pokras, which is an excellent resource for ideas about how to manage a team approach to adaptation or any other project.

ACTION PLANNING FORM

Action Needed	Responsible Person	Deadline for Completion	Resource Needs and Sources

BUILD ON LOCAL HUMAN RESOURCES

Human resources such as skills and experiences are usually more important than financial resources. The successful Hungarian adaptation of *A Key to Fresh Water Macro-Invertebrates*, which was presented earlier, engaged a local university professor to research the species that were to be included in the guide and to verify the guide's scientific accuracy. Identify people within your community that will help you accomplish your goal. Are there organizations in your community (i.e., parks, environmental NGOs, or extension agencies), that have local environmental data that could be used in the lesson? Can Volunteers working in other sectors such as education, business, water and sanitation, health, or forestry, provide you with technical information to help improve the materials? Can counterparts and teachers help to improve the instructional quality of the lesson or activity?



BEST COPY AVAILABLE

STEP 4.
DRAFT A VERSION OF THE ADAPTATION AND THEN SHARE IT, USE IT, AND TEST IT.

To test the materials you will need to develop evaluation criteria, a program for testing, and determine who the testers will be. Who tests depends on the nature of the materials. If you have adapted lesson plans that are to be used by teachers, ask teachers to test them in a classroom. Students and teachers both can be surveyed to evaluate the effectiveness of the materials.

Materials can be tested for the aspects listed below (adapted from *Improving Training Quality: A Trainer's Guide to Evaluation*, by Ramli Mohamed, Yoke-Lim Khor, and Monina Escalada from the Food and Agriculture Organization [FAO]of the United Nations).

- **CONTENT AND RECALL OF MESSAGE.** Did the audience understand the content of the message? Was the message presented in a way they could remember it?
- **MESSAGE CLARITY.** Was the message clear to the audience? Can they understand the meaning of the information?
- **FORMAT AND LAYOUT.** How does the audience like the format and layout of the publication, including placement of titles, colors, and font?
- **VISUAL LITERACY.** Can the audience understand what the illustrations are trying to convey? Do the images present people and objects in a way that they can be recognized?
- **CULTURAL ACCEPTABILITY.** Is there something in particular that the audience likes or dislikes about the material, or is anything offensive about it?

For more information examine the following documents: *Evaluating Environmental Education Materials*, by Leeann Tourillott and Peggy Britt (found in the EE Toolbox); and *Improving Training Quality: A Trainer's Guide to Evaluation*, by Robert T. Raab, Burton E. Swanson, Tim L. Wentling, and Charles D. Clark, from the FAO.

IMPLEMENTING AN ENVIRONMENTAL EDUCATION PROGRAM

By this point, you should have a team of people who are committed to the program, and have an understanding of the community involved, the environmental problems that need to be addressed, and the materials available to carry out an environmental education program. An action plan is a simple tool to help you implement the program. Create an action plan with your team and list the specific items that need to be completed, the sequence and timing for each step, and the resources you will need. Have a responsible person serve as leader to assure that each task is accomplished.

You can start with a simple action planning form, similar to the one you used to analyze the adaptation. Complete it to capture all the tasks that need to be done to implement the educational program. Also create a planning calendar to help manage the program throughout the year and to ensure that steps are taken in the appropriate sequence. A sample planning calendar appears on the next page. It may help to write the calendar on a blackboard or newsprint for posting on a wall so that the activities can be easily monitored at a glance.

To implement an education program, get other members of the team to make the most significant contributions.

Be prepared to adjust your expectations and timeline as events unfold. Unexpected circumstances always come up, usually causing delays and modifications to plans. Putting a calendar on a blackboard or paper makes it easy to modify should unexpected changes arise in the plan and calendar. You may want to schedule regular "reality checks," during which you and members of your planning team review whether your plans and expectations are realistic. It is possible that significant changes may be needed. Remain flexible.

To implement an education program, get other members of the team to make the most significant contributions. You, as the Peace Corps Volunteer, should not take on most of the workload. The program should be sponsored by a host agency, and counterparts, team members, and leaders should be visible to the community. If you find lack of commitment to the program, it is better to reevaluate the plan rather than work alone as a single individual. If you work alone your efforts will probably end at the end of your service, but work carried out by a team will more likely continue after you leave.

Small Projects Design and Management: Training Manual for Volunteers and Counterparts, a Peace Corps reference manual, proposes that one way to help foster commitment among others is to develop a responsibility chart, which describes responsibilities in specific terms. The chart identifies individuals who are responsible for accomplishing specific tasks to implement the program. However, there are different levels of responsibility for each task and individual. Some individuals have **approval** authority over some tasks. Some people are **responsible** for completing the task and ensuring that all necessary steps are taken. Others

PLANNING CALENDAR

(Adapted from *Small Projects Design and Management: Training Manual for Volunteers and Counterparts*, Peace Corps ICE T0050.)

OBJECTIVES AND TASKS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	RESOURCES
Objective: Conduct a training program for area teachers	▨	▨	▨										
Tasks: 1. Identify trainees		▨											Names of schools and administrators, names of regional administrators, names of teachers
2. Conduct needs assessment			▨	▨									Sample needs assessment and expertise from an APCD or other trainer
3. Design workshop					▨	▨							
4. Secure training facility						▨							
5. Identify resource people to help with training						▨							Extension agent, environmental NGOs, representative from ministry of education

have **supervisory** responsibility. They may not be the responsible person, but they supervise the responsible person and must be kept informed and involved. Others only need to be **informed** for political or other reasons. Some people have a **consultant** role because they have information that will help the responsible person accomplish a task.

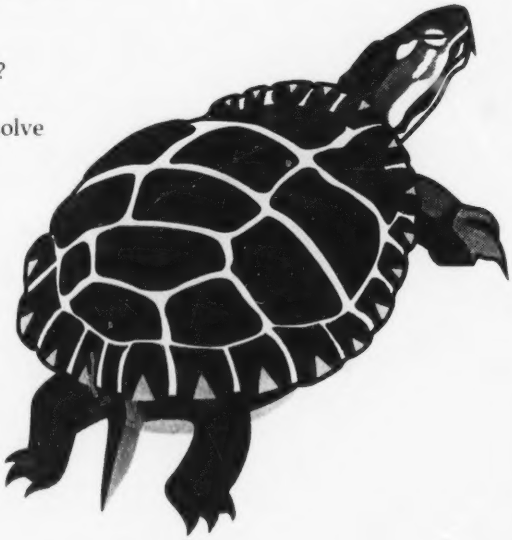
EVALUATING A PROGRAM AND THE EFFECTIVENESS OF ADAPTED MATERIALS

If you have successfully trained people in how to use adapted materials and you have begun conducting environmental education activities and lessons using them, you should conduct a follow-up evaluation six months later to find out whether the materials are working as they were intended. If your adaptation and environmental education program are successful, you will probably want to finalize them by publishing and distributing them. This is where the benefits of keeping low project costs will show up. If the evaluation uncovers the need for further modifications, you can easily make changes to low-cost materials. Remember the example of the posters that were brought to Hungary and reproduced at great cost, but had limited educational value. Low-cost materials can be considered "works in progress," which can absorb new experiences and information as time goes by. It also pays to print just a few copies and invest resources and efforts into training and follow-up rather than printing many copies that will sit on a shelf because there are not enough resources available to distribute them.

In addition to evaluating the effectiveness of materials, your environmental education program should be evaluated against the goals and objectives you established.

In addition to evaluating the effectiveness of materials, your environmental education program should be evaluated against the goals and objectives you established. You may want to evaluate progress made at several different levels by asking the following questions:

- Are the environmental problems solved or being solved?
- Have the target audiences adopted behaviors that will solve or prevent environmental problems?
- Are trainers being trained to conduct environmental education lessons and activities? If so, are they conducting environmental education programs?
- Are the target audiences participating in environmental education programs?
- Are the materials that were adapted effective?



49

You may also want to conduct a quantitative evaluation that asks questions such as the following:

- How many publications have been printed and distributed?
- How many trainers have been trained? What percentage of these trainers are women or underrepresented members of the community?
- How many students have participated in educational programs?
- How much time and resources have been spent on the program?

A critical element of evaluation is to determine whether or not the program is sustainable after the initial round of effort. Questions that may help you determine whether or not the program will continue on its own include the following:

- Have established institutions (government, private, or volunteer) assumed responsibility for key activities of the environmental education program and have they dedicated staff and resources to it?
- If the program will need additional or continual sources of funding or other resources, have sources been established and have other people been able to successfully solicit funding from them?

Finally, keep in mind that there are many reasons why an environmental education program may not achieve its ultimate goal of improving environmental conditions. If people have not changed their behavior to that suggested by the environmental education program, assess whether people have learned and understood the program's message. David and Diane Wood suggest that evaluators of environmental education programs ask themselves the following questions:

- Have people received the message?
- Have they understood the message?
- Does the message conflict with established beliefs and traditions?
- Do they trust the agency or educators delivering the program? Do they lack concern about environmental problems?
- Are social or political forces creating a resistance to change? Are the actions being advocated by the program unrealistic or economically unsound?

If people are implementing the measures advocated by the environmental education program but the environment has not improved, then:

- Is the technical solution appropriate?
- Are the people whose behavior has changed not those who cause the environmental problem?
- Is more time needed to evaluate the situation?

PRINCIPLES OF SUCCESSFUL ADAPTATION

1. Build your adaptation on the foundation of an environmental education plan with clear objectives for what you hope to accomplish.
2. Collaborate to develop and implement an environmental education program and to adapt materials:
    - Build partnerships with people and organizations who can support your efforts;
    - Build on the knowledge of others;
    - Find experts—make a list of possible sources and contacts and follow-up with meetings;
    - Promote interdisciplinary links between technical sectors and between educators and scientists.
3. Identify, screen, and select the best environmental education material to adapt. Look wide for resources, screen them to find those that will most likely meet your needs, and then select those to work on further.

Build your adaptation on the foundation of an environmental education plan with clear objectives for what you hope to accomplish.

51

4. Conduct an in-depth evaluation of the selected materials to find those that are the highest quality and will best meet the needs of your program. Adaptation takes time and energy, and you want to invest only in the best materials that are available.

5. Give credit where credit is due by recognizing the original authors and obtaining clearance to use copyrighted materials.

6. Approach the adaptation systematically once materials have been selected. The steps in this systematic approach include the following:
   - Identify adaptation partners;
   - Identify adaptation issues;
   - Identify what specific steps are needed to carry out the adaptation and who will be responsible for each;
   - Complete a draft version of the adaptation and test it.

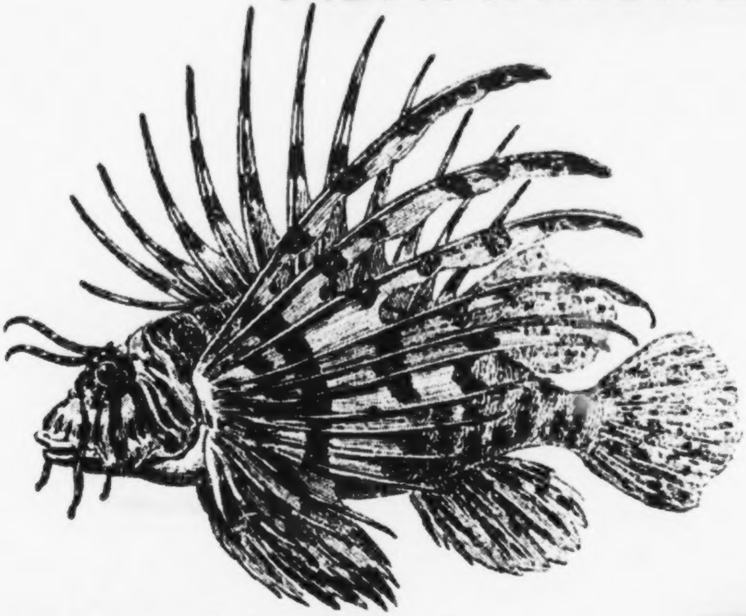
7. Build in an evaluation mechanism and test again:
   - Incorporate a review of the adaptation in draft form;
   - Test materials before finalizing them;
   - Don't make a large financial investment until materials have been tested.

8. Recognize that adaptation is a question of scale but that the concepts of adaptation apply to every document, whether it is a single lesson plan or a complete book.

9. Be aware that unadapted materials in the wrong setting can be demoralizing and unproductive. Your efforts to adapt good materials to your community are worth your effort.

Adaptation takes time and energy, and you want to invest only in the best materials that are available.

ADAPTATION EXAMPLES



ADAPTING FOR SIMPLER AND FEWER MATERIALS

ADAPTATION EXAMPLE 1

Photocopies, resource books, and other supplies often are not available to Peace Corps Volunteers and other environmental educators. Lessons and activities that require these types of resources in their original forms can be adapted to fewer and simpler materials, while retaining the original framework.

For example, in locations where materials and supplies are limited, students are accustomed to copying notes from a blackboard and listening to lessons rather than reading them. Educators in these situations often are masters at using a blackboard to make drawings and diagrams; so rather than using photocopies, a teacher can transfer information to a blackboard and ask students to copy it into their notebooks. Rather than handing out copies of things for students to read, teachers can read aloud and ask students to take notes.

Some general guidelines for adapting lessons and activities for simpler and fewer materials include the following:

MAPS, CHARTS, GRAPHS

- Using a grid, transfer maps onto a large sheet, a blackboard, or wall by enlarging small copies from teachers' notes or reference books. Students can copy maps by the same method. For more information on how to do this, refer to *The World Map Project*, a Peace Corps publication available from ICE or your IRC.
- Put charts and graphs on a blackboard and ask students to copy them into notebooks.
- If a limited number of copies are available, students can work in small groups by standing or sitting together around a graph, chart, or map.
- Teachers of different subject areas who may have lessons on scale, linear measurement, graphs, charts, or map reading can be engaged to help conduct the activity.

READING MATERIALS

- Outline major points in advance on a blackboard. Read the material aloud and ask students to copy it into their notebooks. Then hold a group discussion about the topic.
- Give students a pertinent question to listen for before a segment of material is read aloud. Give them time to note the answer. Their notes become their reference and can be used for a discussion.
- Circulate a copy of the reading material and ask each student in turn to read a paragraph aloud.
- Cut a copy of the reading material into sections and distribute each section to small groups of students. Ask each group to prepare a summary of their section for the whole class.
- Provide one copy of reference materials, such as teachers' notes, for use by groups or individuals for research.

MAP MAKING AS AN INTERDISCIPLINARY ACTIVITY!

Asking teachers and students to make their own maps rather than giving them photocopies of maps offers a good opportunity to create an interdisciplinary activity. For example, engage math or geography teachers to conduct a part of an activity that involves creating or enlarging maps as a part of a math class on measurement and scale, or a geography class on mapping countries of the world. A science or environmental education class can then work with the maps to chart the effects of the Chernobyl explosion and learn about the associated environmental issues. It may be that painting a world map in a central place within the school grounds would be welcomed by teachers from a variety of subject areas or could be taken on as an extracurricular activity. The map can then be used for "Pollution Pathways" and any number of other lessons and activities within different subject areas.

BEST COPY AVAILABLE

ADAPTING "POLLUTION PATHWAYS"

The environmental education activity "Pollution Pathways" (found on pages 396-401 of *Environmental Education in the Schools-Creating a Program that Works!*) requires copying facilities, a map of the world, and other supplies in their original form; however, the activity can be adapted for use where such facilities and supplies are not available. *The World Map Project* (Peace Corps publication R0088, available from an IRC) can help teachers make a map to scale rather than using a printed map, copies, and handouts. The following suggestions make the original activity more appropriate for use in places where only simple materials are available.

1. Copy maps on a blackboard, wall, or in notebooks. In the original activity, teachers work with copies of a European map and a world map or atlases. If copies of a map are not available, a teacher or a small group of students can draw a world map and an enlarged European map on a blackboard or wall using the techniques described in *The World Map Project*. Students then copy the European map into their notebooks by using a grid that the teacher draws and superimposes over the map on the blackboard, rather than working with photocopies of the European map.

2. Locate Chernobyl on a map in a notebook. Instead of using photocopies, students locate Chernobyl on the map they drew in their notebooks, while one student locates and marks Chernobyl on the large world map.

3. Divide the "pollution points" into parts for a small group activity. In the original activity students are given photocopies of the "pollution points," or places where radiation was detected on the days following the explosion. Instead of each student needing a copy, divide students into pairs or small groups, and distribute the pollution points among them. Each student pair or group locates their pollution point on the world map and identifies it on the large outline map for the benefit of the entire class, and thus charts the progress of the pollution day by day. All of the students mark the map in their notebooks with the number of the day on the correct country and writes in the name of the country. As each group or pair locates their pollution point on the map, they read what happened on that day in those countries. All students write down when, where, and what happened in their individual notebooks, based on the information provided by the other students.

4. Add additional background information. The text of "Explosion at Chernobyl" from the original activity can be used by a teacher to tell the story of Chernobyl and to set the tone for the activity. This may not provide enough background information for teachers who are not familiar with the topic and who have limited access to other reading material to learn more about the subject. If more background information is needed, work with reference

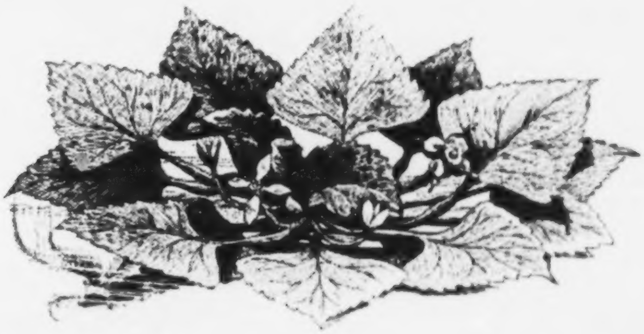
books, scientists, or universities to find additional information about nuclear energy and wind-borne air pollution. Adapt the activity by expanding the introduction to include more written background information for the teacher.

The Peace Corps publication* Nonformal Education Manual, *which is available from your IRC, has recipes and instructions for making blackboards, chalk, and paint, if these materials are not available for purchase in your area, or if your school is not well-equipped.

5. Make your own blackboard, chalk, and paint if none are available. The Peace Corps publication *Nonformal Education Manual*, which is available from your IRC, has recipes and instructions for making blackboards, chalk, and paint, if these materials are not available for purchase in your area, or if your school is not well-equipped. One Peace Corps Volunteer in West Africa told of collecting the leftover bits of chalk from all of the teachers at the school and grinding them up to recycle them into new chalk for use in environmental education lessons.

6. Map an important event in your geographic area. If nuclear power is not a relevant environmental issue in your area, you may be able to adapt this activity to other geographic events. For instance, it would be more relevant for children in the Sahel to map desert encroachment using a map of West Africa. If you live in a forested area where deforestation is an environmental issue, you could map the extent of forest cover and the deforestation rate using a map of the region.

Materials Needed (Original Version)	Materials Needed (Adaptation)
♦ Large world map ♦ Copies of European area map for each student ♦ "Pollution Pathways" handouts for each student ♦ Bulletin board ♦ Pushpins ♦ Atlases, world map, or both	♦ World map (large or small) and European outline map drawn on a blackboard or chart ♦ Pollution points by day written on individual slips of paper ♦ Blackboard and chalk ♦ Student notebooks and pencils ♦ *The World Map Project* manual

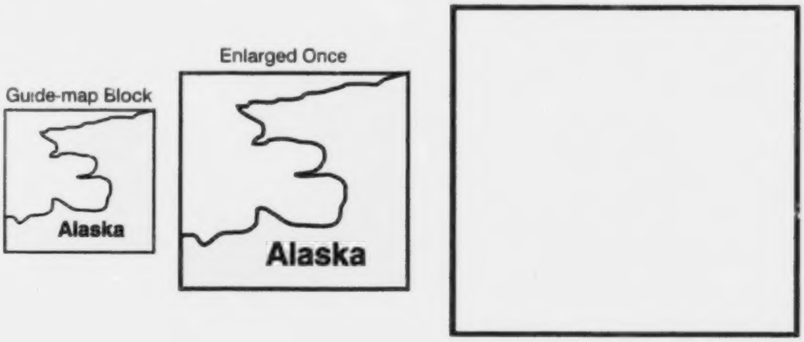


PRACTICE EXERCISE #2: DRAWING MAPS BY GRID

DIRECTIONS: Read the suggestions below; then practice your map drawing skills using the grid.

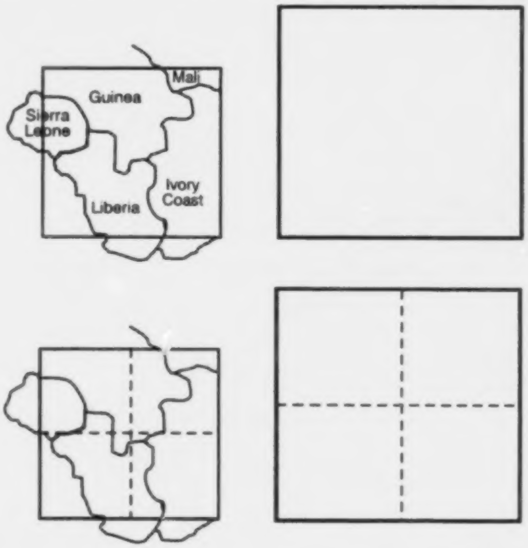
ENGLARGING YOUR DRAWING

First, look at the guide-map block. Do you see how the form in the "enlarged once" block is larger but still has the same shape and proportions? When you draw, make sure the country border or coast lines cross the large grid block in proportionately the same place as in the guide map block. Now, you try it. In less than a minute, you've drawn over a thousand miles of North Alaskan coastline.



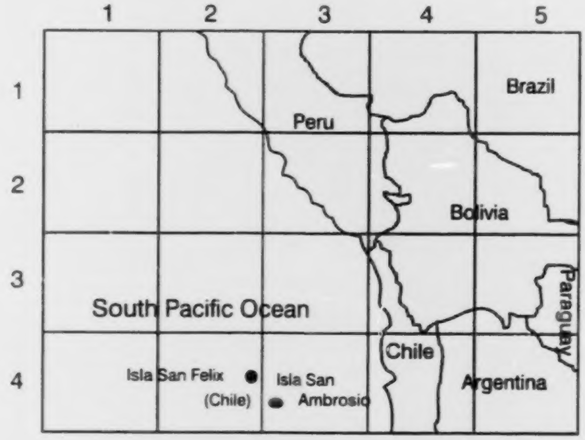
SUB-DIVIDING DIFFICULT BLOCKS

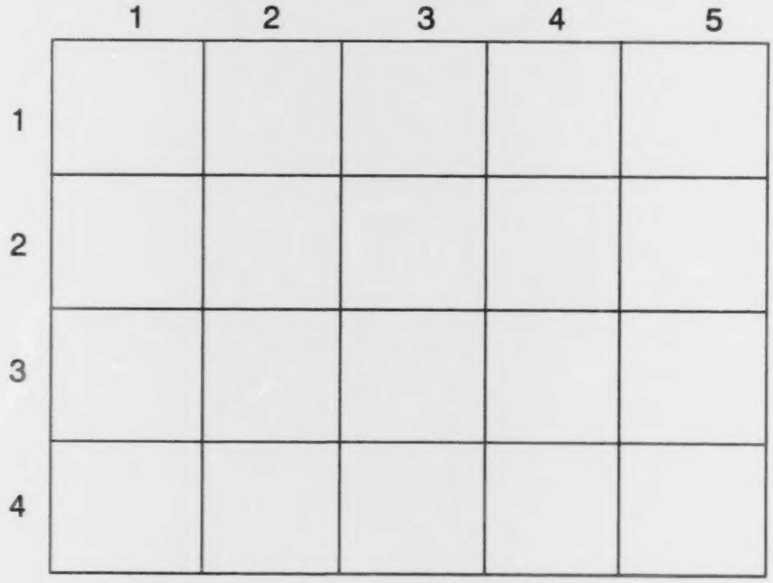
Drawing difficult map blocks will be four times as easy if you divide the guide map block into four smaller blocks. Be sure to sub-divide the same block on the large map grid as well.



PUTTING IT ALL TOGETHER

As you draw this section of South America, notice where the borders cross the grid blocks. Remember to draw one block at a time.


1
2
3
4
5
1
2
3
4
Brazil
Peru
Bolivia
South Pacific Ocean
Paraguay
Chile
Argentina
Isla San Felix
(Chile)
Isla San
Ambrosio



Reprinted from the Peace Corps publication *The World Map Project*.

POLLUTION PATHWAYS

OBJECTIVES:
Describe some of the ways rain forest destruction affects the plants and animals that live there.

AGES:
Intermediate, advanced

SUBJECTS:
Science, geography

MATERIALS:
Large world map, copies of area map and Pollution Pathways handout, bulletin board, pushpins, atlases and/or world map

There are no state or national boundaries in the atmosphere. Winds can carry pollutants hundreds or even thousands of miles from their origin, creating air pollution in other regions. By tracing the movement of radiation released during an accident at the Chernobyl nuclear power plant, your students will see how air pollution can become a global issue.

Before you get started, hang a large world map on a bulletin board. (Later, you'll be using pushpins to mark different places on the map.) Then begin by asking the kids to name some sources of air pollution. Explain that as weather systems move through an area, winds pick up and carry air pollutants. Eventually these pollutants fall from the sky as dry particles, or they are washed back to earth by rain, snow, or fog. Also explain that, in general, the distance air pollutants travel depends on how high in the atmosphere they go. Pollutants that don't rise very high tend to be deposited relatively close to their source. But pollutants that are lifted high in the atmosphere may travel thousands of miles before they drop back to earth.

Next, point out the location of the Chernobyl nuclear power plant on a world map (see page 52), and use the information under "Explosion at Chernobyl" on page 50 to tell the students about the accident. Explain that the radioactive gases and particles released by the explosion formed a toxic cloud that soon split into two parts. Point out that the plant released radiation for 10 days after the explosion, and since the winds shifted several times during this period, radiation was carried in many different directions. By tracking the radioactive particles and gases released by the explosion, scientists learned a lot about how air pollutants travel from place to place.

Now pass out a copy of page 51 to each person and explain that each of the 29 "Pollution Points" on the page describes when the radioactive cloud from Chernobyl reached a certain location. The points are grouped under the heading of Day 2, Day 3, and so on. This indicates how many days after the explosion it took the radioactive cloud to reach a certain location. For example, the radiation reached Stockholm, Sweden, on April 28, the third day after the explosion. (Note: The information on page 51 doesn't include all the countries that received radiation from Chernobyl, and in some cases, the dates indicating when radiation reached certain areas are approximations.)

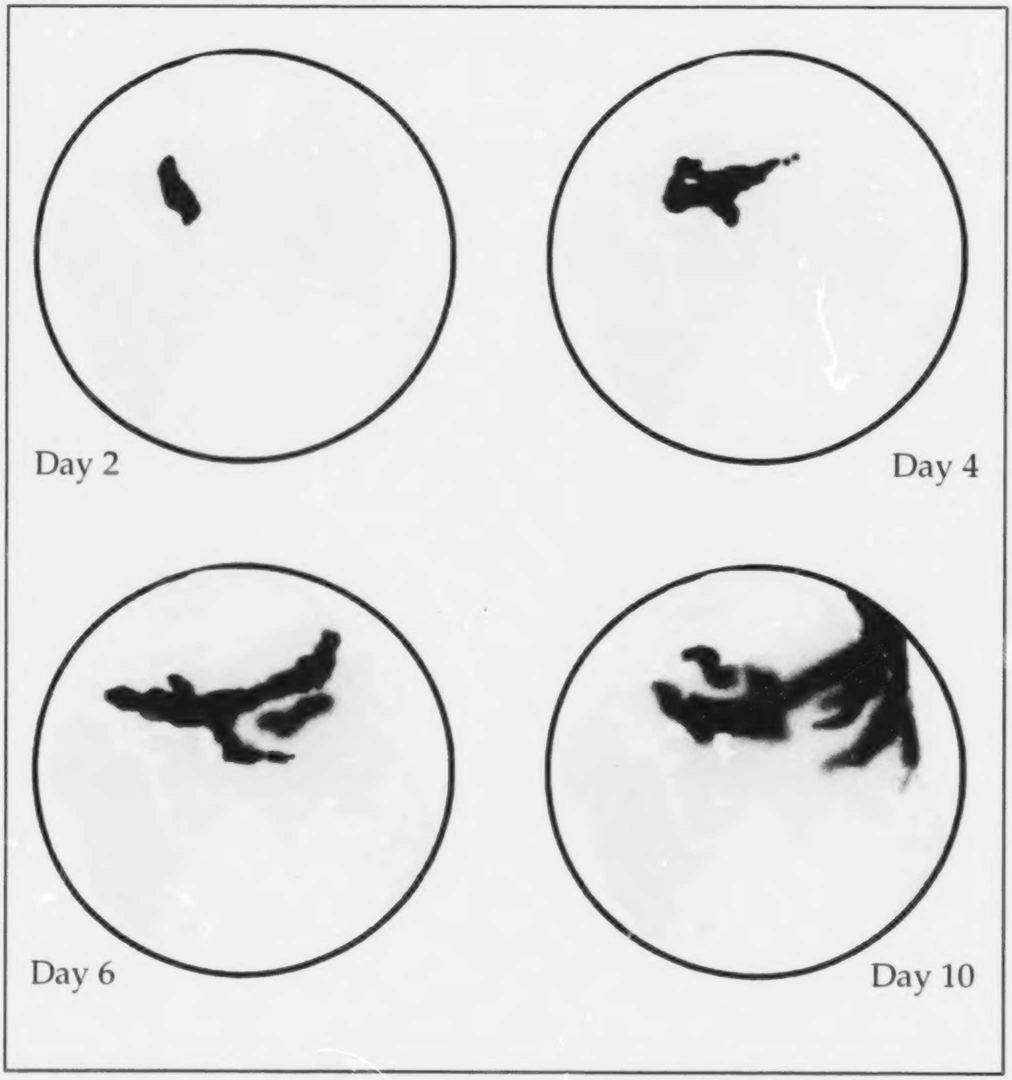
Next split the group into two teams and explain that the members of each team will be working together to map the "Pollution Points." Mark Chernobyl's location with a pushpin on the world map. Have the teams gather close to the map and explain that the mapping will start with someone from the first team reading pollution point 1 out loud. He or she will have 40 seconds to find that city on the map and mark it with a pushpin. Team members can help the player by giving directional tips, such as "move closer to Spain," but they can't point to any specific location on the map. If the team members find the point within 40 seconds, his or her team gets one point. If not, the other team gets a chance to find the correct location. Have the teams take turns locating the points until all 29 points have been mapped.

Next, give each person a copy of page 52 and set out some atlases and/or world maps. Tell the kids that they'll plot some of the points on the map so that they'll have a record of where much of the radiation released from Chernobyl traveled. They can use the atlases and world maps to help them find the points. (Tell the students that, because of the limited area shown on their maps, they'll be able to plot only the first 22 points.) Have the students write in the number of the day for each location (not the number of the pollution point). This way their maps will show how far the pollution traveled within a certain number of days. For example, when they plot pollution point 1, they'll write a small number "2" where Gdansk is located in Poland.

After the students have finished mapping, ask them to describe how rainfall affected the amount of radiation that fell on certain areas. (More radiation reached the ground in areas where it rained.) Point out to the students that "pollution on the move" also causes problems in the U.S. Discuss how pollutants produced by coal-burning power plants in the Midwest contribute to acid rain that falls in the eastern U.S. and Canada. Explain that acid rain-causing pollutants pour out of smokestacks that are sometimes more than 1,000 feet tall! These tall stacks were built to reduce air pollution problems near the plants. Unfortunately, the tall-stack solution created pollution problems for other regions. The stacks shoot the pollutants high in the atmosphere, where they're picked up by high-altitude winds. These winds may carry the pollutants thousands of miles away, resulting in acid rain in other regions.

Reprinted with permission from *Ranger Rick's Naturescope: Pollution—Problems and Solutions* published by National Wildlife Federation (1990).

TRACKING THE RADIATION (DAY 2-DAY 10)


Day 2
Day 4
Day 6
Day 10

Printed with permission from Lawrence Livermore National Laboratory.

EXPLOSION AT CHERNOBYL

THE BIG BLAST: On April 26, 1986, at 1:23 AM, Chernobyl became the site of the world's worst nuclear power plant accident. Operators were shutting down one of the reactors for maintenance when the power suddenly surged and the reactor exploded. The blast blew the reactor apart and sent radioactive gases and particles as high as 3 miles into the atmosphere. Two plant workers were killed by the explosion. Later 29 others died from radiation exposure.

Within days, more than 120,000 people were evacuated from an 18-mile radius around the plant. As fires inside the reactor burned, helicopters dumped tons of lead, sand, and other minerals on the flames. Despite these efforts, the fires burned for 10 days after the blast, continuing to release radioactive pollutants into the air.

WHERE IT WENT: The explosion resulted in a huge cloud that soon split into two parts. One part of the cloud moved northwest toward Poland and Scandinavia, and then southwest across central Europe. The other part of the cloud moved east across Asia, over Japan and the North Pacific, and eventually reached western North America. (The "Pollution Points" on page 51 track the movement of both parts of the cloud.) And as the reactor continued to burn, it released radiation that moved south and east of the plant. But scientists believe that, in most cases, the amounts of radiation deposited outside the then Soviet Union were relatively low.

EFFECTS OF THE EXPLOSION: The first few weeks following the Chernobyl blast were filled with confusion. Some European countries ordered the destruction of millions of dollars worth of contaminated produce, milk, and livestock. But in other nearby European countries, people were told that there was no danger and that it was safe to consume these products. Farmers suffered huge financial losses when countries in other parts of the world refused to import produce from Europe.

The explosion also strained relations between the Soviet Union and other nations. Many countries were angered by the Soviet Union's delay in reporting the accident (officials didn't announce it until April 29).

CHERNOBYL'S LEGACY: The damaged reactor at Chernobyl now stands entombed in thick layers of concrete and steel, while the other reactors at the plant are again producing energy. But the disaster is still taking its toll. Some scientists predict that within the next few decades, thousands of people who were exposed to the radiation could develop cancer.

POLLUTION PATHWAYS (A)

POLLUTION POINTS

DAY 2—APRIL 27

1. Winds blow radioactive cloud northwest over Gdansk, Poland

DAY 3—APRIL 28

2. Radioactive cloud reaches Stockholm, Sweden
3. Radioactive cloud reaches Helsinki, Finland.
4. Radioactive cloud reaches Oslo, Norway.

DAY 4—APRIL 29

5. Radiation continues moving north through Scandinavia and reaches Trondheim, Norway.
6. Radiation detected in Copenhagen, Denmark.
7. Winds carry radioactive cloud to Prague, Czechoslovakia.

DAY 5—APRIL 30

8. Cloud moves over Munich, West Germany. Heavy radiation falls when it rains in this area.
9. High amounts of radioactive particles wash out when it rains in Vienna, Austria.
10. Radioactive cloud reaches Geneva, Switzerland.

DAY 6—MAY 1

11. Cloud travels to Rome, Italy.
12. Radioactive cloud reaches Budapest, Hungary.
13. Winds carry radioactive cloud to Zagreb, Yugoslavia.
14. Radiation detected in Paris, France.
15. Radioactive cloud reaches Tromso, Norway.

DAY 7—MAY 2

16. Small amounts of radiation measured near Reykjavik, Iceland.
17. Radiation reaches Bucharest, Romania.
18. Winds carry radioactive particles into Brussels, Belgium.
19. Radioactive cloud moves over London, England. High amounts of radiation wash out when it rains north of London.
20. Radioactive cloud detected in Sofia, Bulgaria.

DAY 8—MAY 3

21. Radioactive cloud reaches Glasgow, Scotland.
22. Winds carry radioactive cloud to Athens, Greece.
23. Radioactive particles detected in Ankara, Turkey.

DAY 9—MAY 4

24. Radiation reaches Beirut, Lebanon.

DAY 10—MAY 5

25. Radiation detected in Damascus, Syria.

DAY 11—MAY 6

26. Radioactive particles reach Kuwait City, the capital of Kuwait.
27. Radioactive cloud moves over Xian, China.

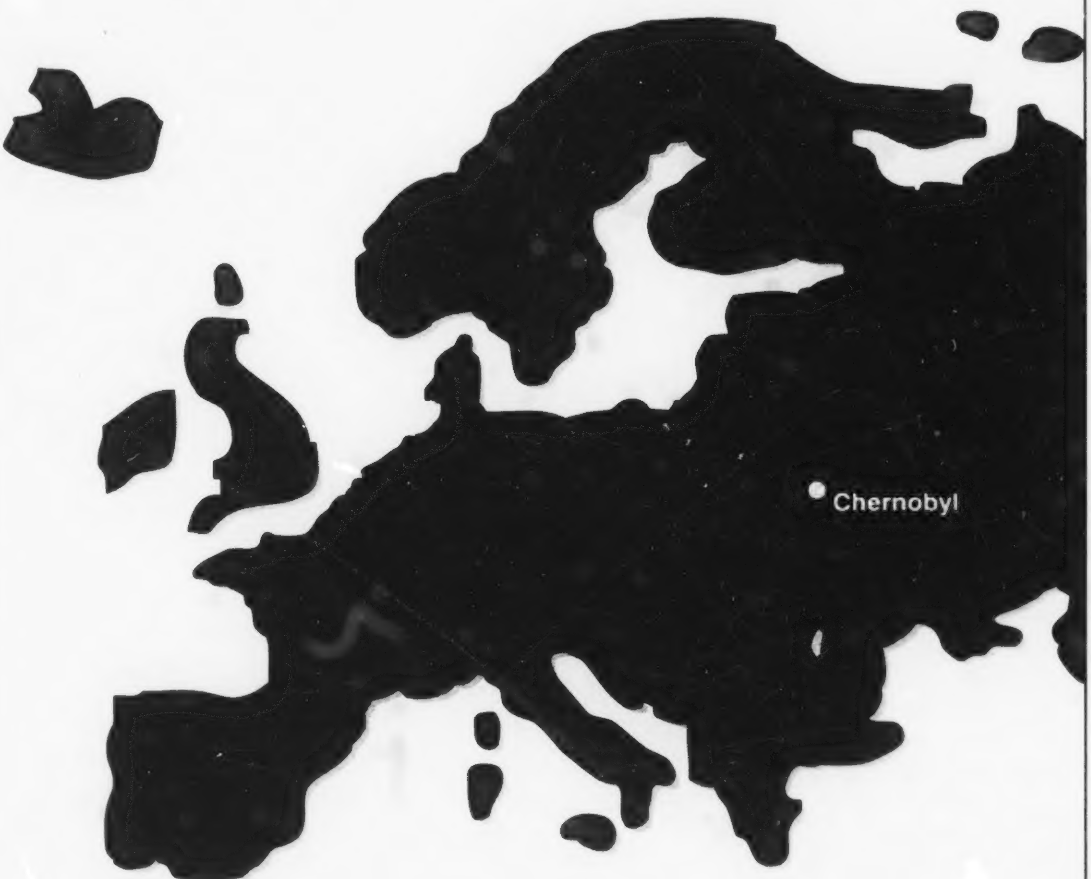
DAY 12—MAY 7

28. Radioactive particles reach Tokyo, Japan.

DAY 13—MAY 8

29. Slight amount of radiation detected in Richland, Washington, in the United States.

POLLUTION PATHWAYS (B)



"Pollution Pathways" is reprinted with permission of the National Wildlife Federation from the *Pollution-Problems and Solutions* issue of *NatureScope*. For more information about the National Wildlife Federation and its educational programs, please call 703/790-4000, visit their World Wide Web site at http://www.nwf.org, or write to: National Wildlife Federation, 8925 Leesburg Pike, Vienna, VA 22184-0001, USA.

64

ADAPTING TO LOCAL REALITIES

ADAPTATION EXAMPLE 2

The Centre for Environment Education in Thaltej Tekra, India, adapted the National Wildlife Federation's *NatureScope Amazing Mammals* for use in India. Among the things they learned was that the nature and degree of adaptation depends on the issue being dealt with. For example:

- Basic scientific concepts require minimal adaptation (for example, substituting names of species and geographic locations). Although this may not require a lot of modification of the lesson plan format, it may require a great deal of research in order to get authentic information about local wildlife and habitats.
- Habitats require a greater degree of adaptation because they may be totally different from one location to another.
- Human-environment relationships may require a total rewrite with an original format because social, economic, political, cultural, and educational systems are bound to be vastly different.

In the environmental education activity "A Menu for Mammals" (from *NatureScope Amazing Mammals*), students create a menu for different mammals as a means of understanding animal diet and concepts such as omnivore, herbivore, and carnivore. The Indian adaptation of the activity uses mammals and foods from India in contrast to the sample menu from the American version, which uses mammals and foods that are familiar to North American children. The concept of the activity and the activity design remain similar, but the adapted version uses different mammals and foods, depending on the location.

Teachers must be prepared to undertake research to get authentic local data and information in order to adapt materials.

Teachers must be prepared to undertake research to get authentic local data and information in order to adapt materials. At the very least, a teacher must understand the types of local mammals and their diets and the local foods that people eat. Teachers can contact local extension services, forestry departments, NGOs, or universities for help in identifying local wildlife and understanding their feeding habits. Students can be engaged in the research by conducting sighting surveys or by interviewing local officials, farmers, or their parents to make a list of important local mammals and their food preferences.

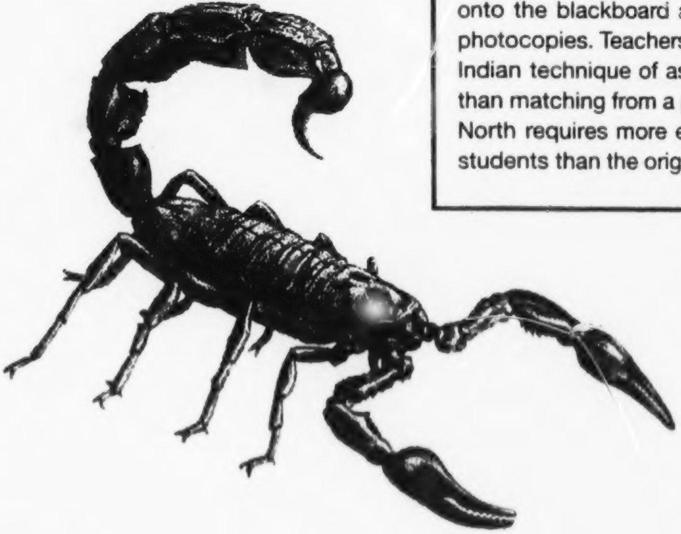
Local images are important because children may not have a chance to see local animals up close. High-quality posters or charts may be available for loan or give-away from local government officials of the agriculture or forestry services, NGOs, or universities. Artists may be engaged to draw high-quality pictures of local mammals. Otherwise, students can be engaged to draw pictures of wildlife to include in an adapted lesson. A drawing contest for students using local community leaders as judges could encourage participation if this is appropriate in your culture.

In the original version of the activity, teachers provide students with photocopies of an activity to match animals with their food preferences. The Indian adaptation calls for a teacher to copy the list of animals and their food preferences on a blackboard as a reference for students, who then carry out the matching exercise verbally or by writing in their notebooks. The Indian version then goes a bit further, asking students to create their own animal menus using the information provided and their imaginations.

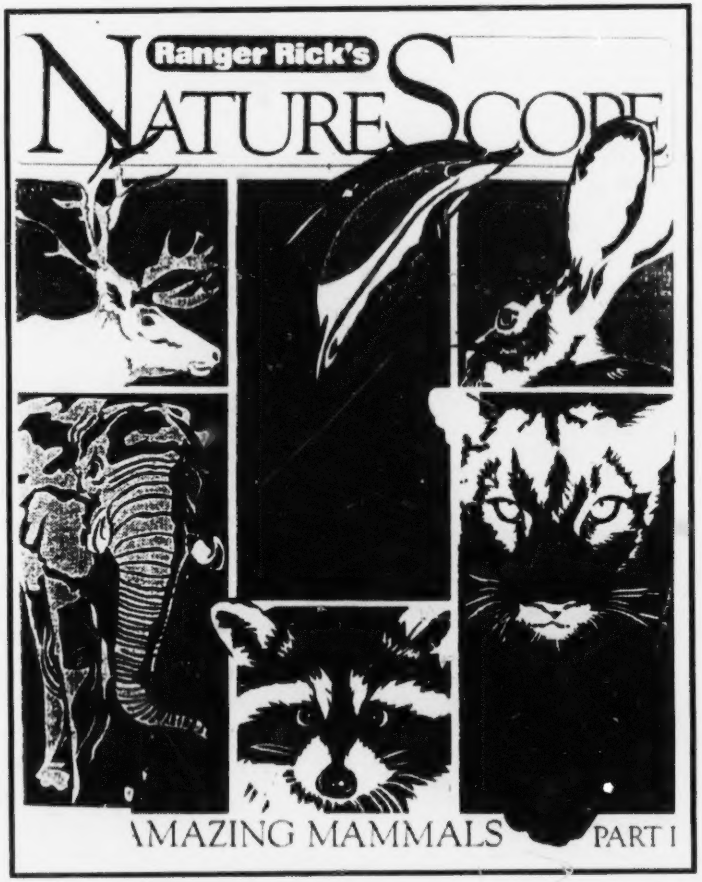
When making the adaptation, the Centre for Environment Education was especially careful to consider the final look of the publication. They wanted the publication to be attractive and well-designed, so layout was particularly important. However, they avoided glossy paper and other elaborate printing materials and techniques in favor of a simpler presentation and paper quality that was more familiar to students and teachers. The final publication was readily accepted in Indian classrooms.

Adapting Lessons from South to North!

Teachers in the United States can adapt "A Menu for Mammals" to make it more environmentally friendly by taking lessons from the Indian version, which uses fewer photocopies and less energy. Teachers can use the original information about food preferences but make use of the Indian techniques of copying the menu and food preference list onto the blackboard as a reference for students rather than making photocopies. Teachers can also adapt the original version by using the Indian technique of asking students to make their own menus rather than matching from a preexisting menu. This adaptation from South to North requires more engagement and imagination on the part of the students than the original version, and is friendlier to the environment.



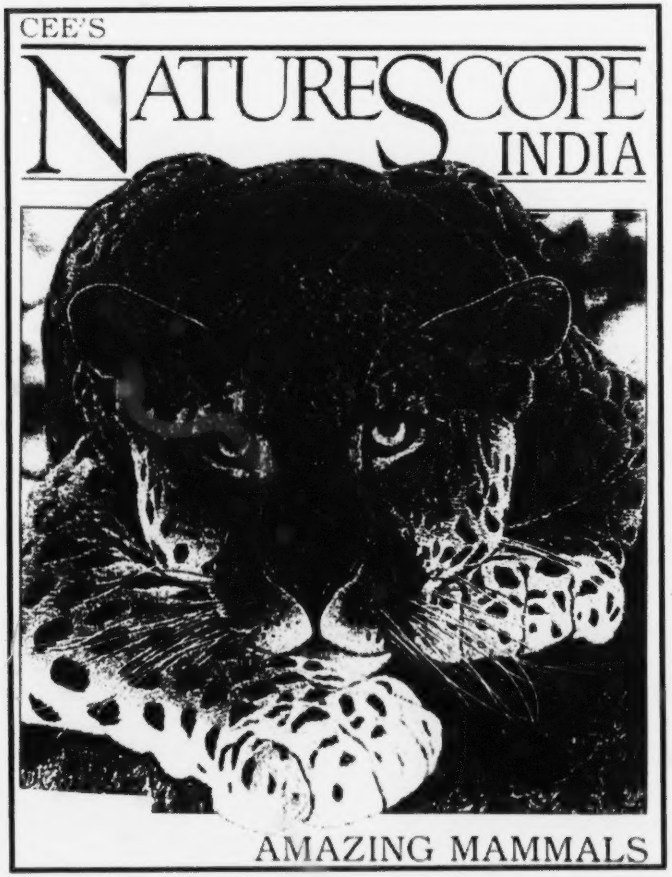
"A Menu for Mammals" is reprinted with permission of the National Wildlife Federation from the *Amazing Mammals-Part 1* issue of *NatureScope*. For more information about the National Wildlife Federation and its educational programs, please call 703/790-4000, visit their World Wide Web site at http://www.nwf.org, or write to: National Wildlife Federation, 8925 Leesburg Pike, Vienna, VA 22184-0001, USA.



Ranger Rick's

NATURESCOPE

AMAZING MAMMALS PART I



CEE'S

NATURESCOPE

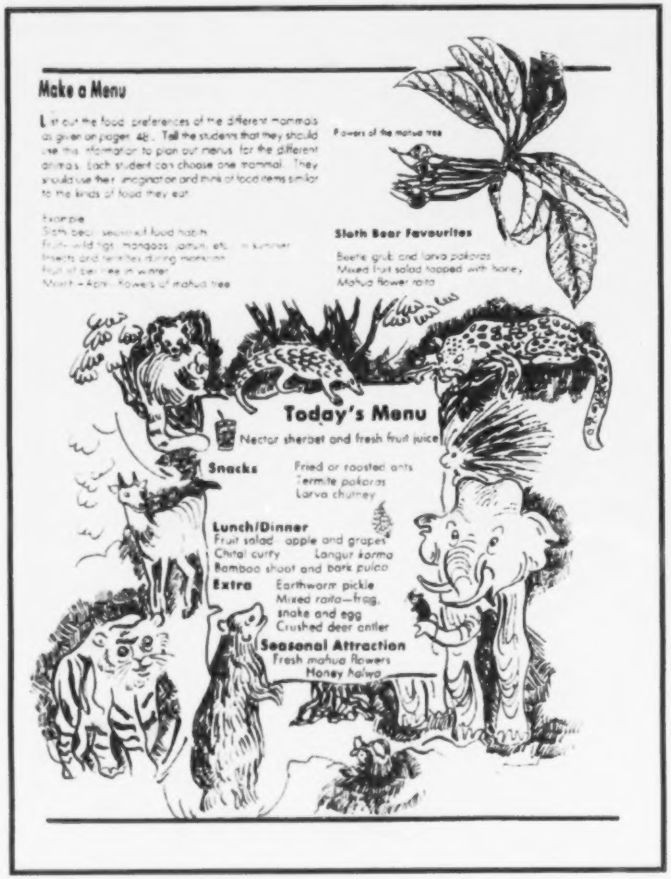
INDIA

AMAZING MAMMALS

66 A

66 B

A Menu for Mammals is reprinted with permission from the Centre for Environmental Education, Thaltej Tekra, India.



Make a Menu

List out the food preferences of the different mammals as given on pages 46. Tell the students that they should use this information to plan out menus for the different animals. Each student can choose one mammal. They should use their imagination and think of food items similar to the kinds of food they eat.

Example
Sloth bear: seasonal food habit
Fruit—wild figs, mangoes, jamun, etc. in summer
Insects and termites during monsoon
Fruit of ber tree in winter
March – April: flowers of mahua tree

Flowers of the mahua tree

Sloth Bear Favourites

Beetle grub and larva pakoras
Mixed fruit salad topped with honey
Mahua flower raita

Today's Menu

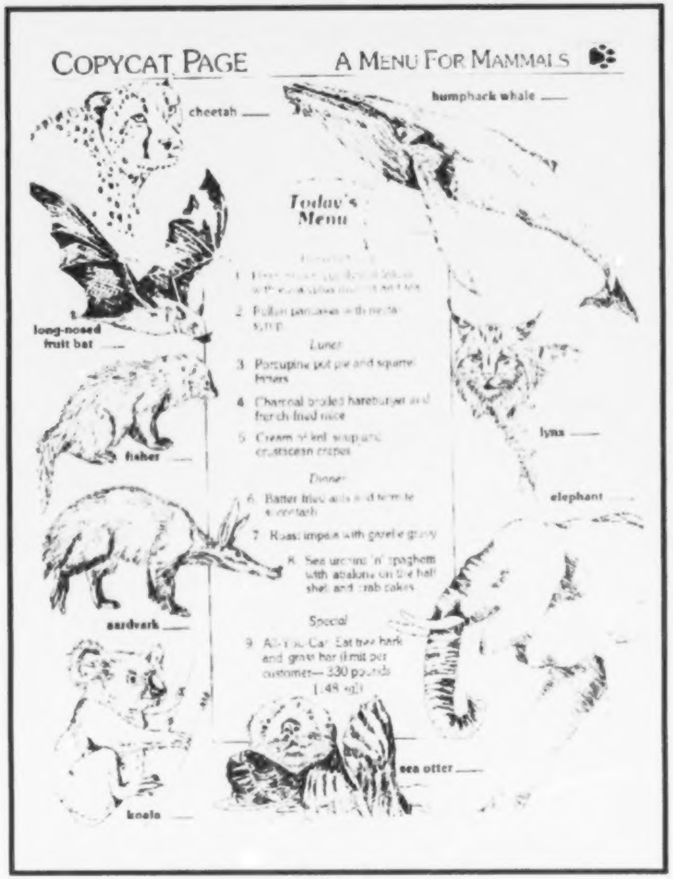
Nectar sherbet and fresh fruit juice

Snacks Fried or roasted ants
Termite pakoras
Larva chutney

Lunch/Dinner
Fruit salad: apple and grapes
Chital curry Langur *korma*
Bamboo shoot and bark *pulao*

Extra Earthworm pickle
Mixed *raita*—frog, snake and egg
Crushed deer antler

Seasonal Attraction
Fresh *mahua* flowers
Honey *halwa*



COPYCAT PAGE A MENU FOR MAMMALS

Today's Menu

[illegible]

1. [illegible]
2. Pollen pancakes with nectar syrup

Lunch

3. Porcupine pot pie and squirrel fritters
4. Charcoal broiled hareburger and french fried mice
5. Cream of krill soup and crustacean crepes

Dinner

6. Batter fried ants and termite succotash
7. Roast impala with gazelle gravy
8. Sea urchins 'n' spaghetti with abalone on the half shell and crab cakes

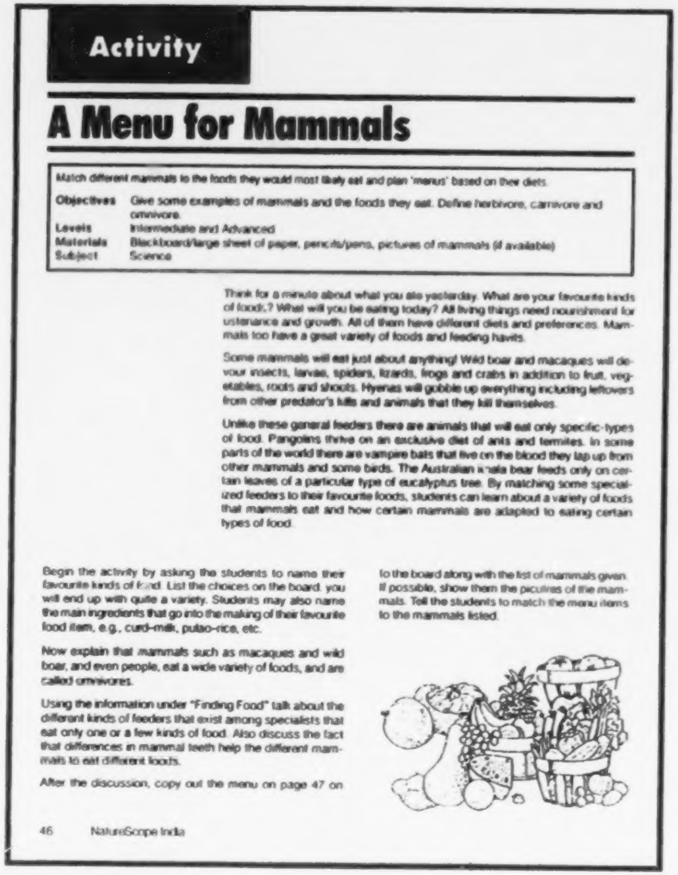
Special

9. All-You-Can-Eat tree bark and grass bar (limit per customer— 330 pounds [148 kg])

47

68

BEST COPY AVAILABLE



Activity

A Menu for Mammals

Match different mammals to the foods they would most likely eat and plan 'menus' based on their diets.

Objectives	Give some examples of mammals and the foods they eat. Define herbivore, carnivore and omnivore.
Levels	Intermediate and Advanced
Materials	Blackboard/large sheet of paper, pencils/pens, pictures of mammals (if available)
Subject	Science

Think for a minute about what you ate yesterday. What are your favourite kinds of foods.? What will you be eating today? All living things need nourishment for ustenance and growth. All of them have different diets and preferences. Mammals too have a great variety of foods and feeding havits.

Some mammals will eat just about anything! Wild boar and macaques will devour insects, larvae, spiders, lizards, frogs and crabs in addition to fruit, vegetables, roots and shoots. Hyenas will gobble up everything including leftovers from other predator's kills and animals that they kill themselves.

Unlike these general feeders there are animals that will eat only specific-types of food. Pangolins thrive on an exclusive diet of ants and termites. In some parts of the world there are vampire bats that live on the blood they lap up from other mammals and some birds. The Australian koala bear feeds only on certain leaves of a particular type of eucalyptus tree. By matching some specialized feeders to their favourite foods, students can learn about a variety of foods that mammals eat and how certain mammals are adapted to eating certain types of food.

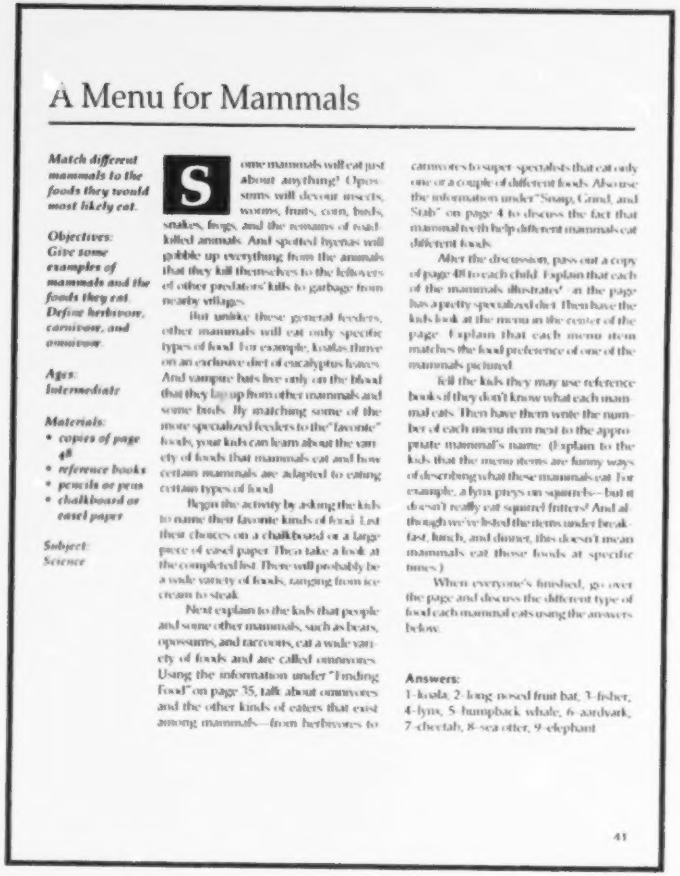
Begin the activity by asking the students to name their favourite kinds of food. List the choices on the board. you will end up with quite a variety. Students may also name the main ingredients that go into the making of their favourite food item, e.g., curd-milk, pulao-rice, etc.

Now explain that mammals such as macaques and wild boar, and even people, eat a wide variety of foods, and are called omnivores.

Using the information under "Finding Food" talk about the different kinds of feeders that exist among specialists that eat only one or a few kinds of food. Also discuss the fact that differences in mammal teeth help the different mammals to eat different foods.

After the discussion, copy out the menu on page 47 on to the board along with the list of mammals given. If possible, show them the picutres of the mammals. Tell the students to match the menu items to the mammals listed.

46 NatureScope India



A Menu for Mammals

Match different mammals to the foods they would most likely eat.

Objectives: *Give some examples of mammals and the foods they eat. Define herbivore, carnivore, and omnivore.*

Ages: *Intermediate*

Materials:

- *copies of page 48*
- *reference books*
- *pencils or pens*
- *chalkboard or easel paper*

Subject: *Science*

Some mammals will eat just about anything! Opossums will devour insects, worms, fruits, corn, birds, snakes, frogs, and the remains of road-killed animals. And spotted hyenas will gobble up everything from the animals that they kill themselves to the leftovers of other predators' kills to garbage from nearby villages.

But unlike these general feeders, other mammals will eat only specific types of food. For example, koalas thrive on an exclusive diet of eucalyptus leaves. And vampire bats live only on the blood that they lap up from other mammals and some birds. By matching some of the more specialized feeders to the "favorite" foods, your kids can learn about the variety of foods that mammals eat and how certain mammals are adapted to eating certain types of food.

Begin the activity by asking the kids to name their favorite kinds of food. List their choices on a chalkboard or a large piece of easel paper. Then take a look at the completed list. There will probably be a wide variety of foods, ranging from ice cream to steak.

Next explain to the kids that people and some other mammals, such as bears, opossums, and raccoons, eat a wide variety of foods and are called omnivores. Using the information under "Finding Food" on page 35, talk about omnivores and the other kinds of eaters that exist among mammals—from herbivores to carnivores to super-specialists that eat only one or a couple of different foods. Also use the information under "Snap, Grind, and Stab" on page 4 to discuss the fact that mammal teeth help different mammals eat different foods.

After the discussion, pass out a copy of page 48 to each child. Explain that each of the mammals illustrated on the page has a pretty specialized diet. Then have the kids look at the menu in the center of the page. Explain that each menu item matches the food preference of one of the mammals pictured.

Tell the kids they may use reference books if they don't know what each mammal eats. Then have them write the number of each menu item next to the appropriate mammal's name. (Explain to the kids that the menu items are funny ways of describing what these mammals eat. For example, a lynx preys on squirrels—but it doesn't really eat squirrel fritters! And although we've listed the items under breakfast, lunch, and dinner, this doesn't mean mammals eat those foods at specific times.)

When everyone's finished, go over the page and discuss the different type of food each mammal eats using the answers below.

Answers:
1-koala, 2-long-nosed fruit bat, 3-fisher, 4-lynx, 5-humpback whale, 6-aardvark, 7-cheetah, 8-sea otter, 9-elephant

41

69

70

BEST COPY AVAILABLE

ADAPTATION EXAMPLE 3

ADAPTING ENVIRONMENTAL EDUCATION LESSONS TO TRADITIONAL CLASSROOM SUBJECTS

Environmental education lessons and activities can be adapted for use in the traditional subjects of math, geography, and English. Many educators believe that environmental content, when it is relevant to students' lives and experiences, can actually enhance traditional subjects by tying them to real life experiences and issues. Some environmental education activity guides, such as the U.S.-based *Project Wild* and *Project Learning Tree*, cross-reference environmental education activities to subjects such as math and language arts, and can be used across a curriculum. The integration of environmental content i[illegible] other subject areas is sometimes referred to as "infusion" environmental education.

The following chart gives some ideas for infusing environmental content into math, history, health, biology, chemistry, and language arts classes.

MAKING CONNECTIONS BETWEEN ENVIRONMENT AND EXISTING SUBJECT AREAS

(From *Integrating Environmental Education into the School Curriculum*, from the EE Toolbox.)

BIOLOGY	NATIONAL HISTORY	HEALTH
• Study population growth; carrying capacity • Study biodiversity • Examine the water cycle • Review plant growth and effects of pollutants on growth rate • Examine soils and erosion • Identify plant and animal species • Examine weather and climate and global climate changes	• Study traditional land-use patterns Examine attitudes toward land and natural resources throughout history • Review influential figures in conservation • Examine resource use and productivity: animals, forests, water use, minerals • Study development of environmental legislation	• Examine radioactive materials and waste • Study food, nutrition, and hunger • Study effects of air pollution on human health • Study effects of water pollution on human health • Review solid waste and disposal options • Review pesticide safety
LANGUAGE ARTS	**MATHEMATICS**	**CHEMISTRY**
• Study vocabulary of environmental terms • Read about nature and environmental issues • Read about solutions and success stories to environmental problems • Interview people about environmental issues • Practice writing and speaking about the environment • Role-play environmental issues from a variety of perspectives	• Study human or animal population growth and change • Calculate landfill capacity and fill rate • Triangulate to locate landscape features • Determine the carrying capacity of an ecosystem • Present data in graphs or charts • Collect and analyze data on energy consumption or water use	• Examine household hazardous wastes • Review production and consequences of acid rain • Conduct water quality tests and water purification • Study chemical composition of air pollution • Study fertilizers, pesticides, and agriculture

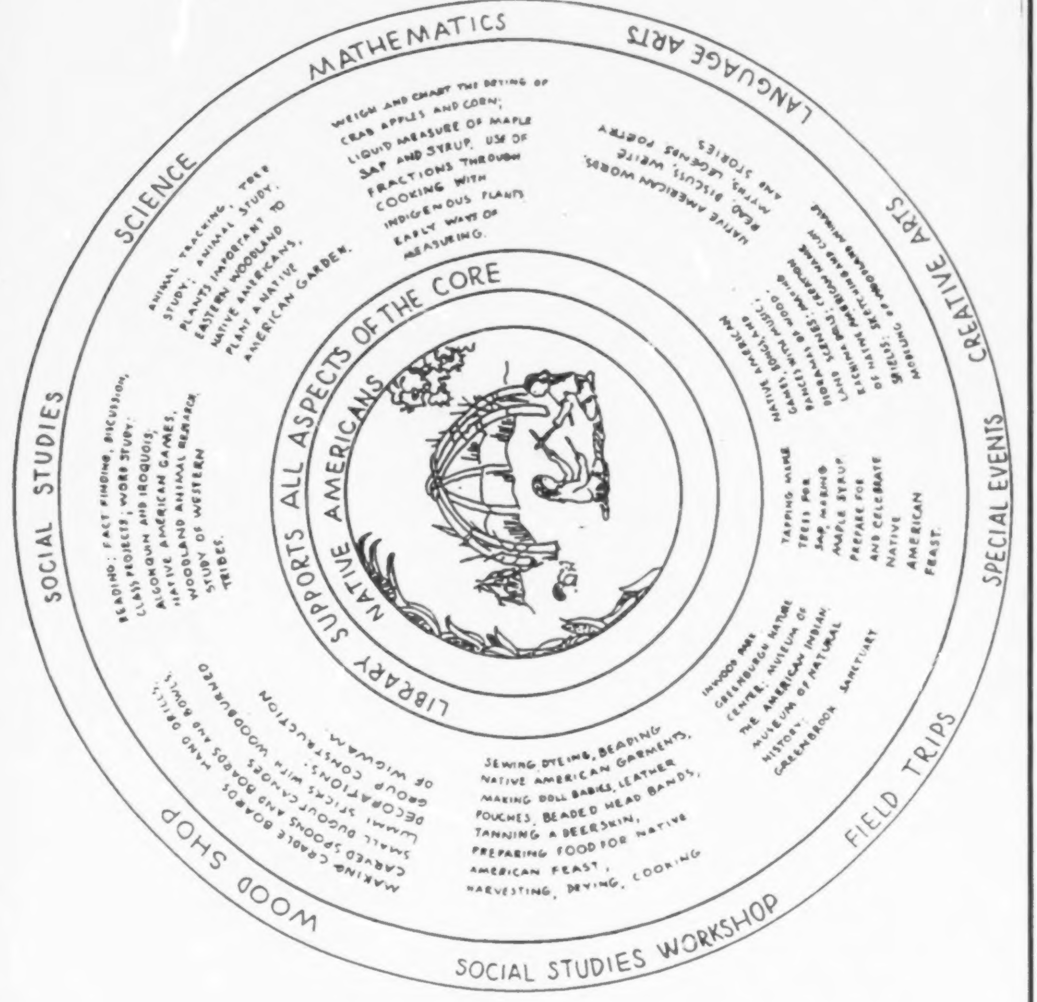
FIELDSTON LOWER SCHOOL INTEGRATED CURRICULUM

In addition to infusing environmental content into individual classes and lessons, some schools are replacing their traditional curriculum with an integrated, environmental theme-based curriculum. The Fieldston Lower School of the Bronx, New York, wove the topic of Native American culture into the entire third grade curriculum. Within this framework, lesson plans were developed to address both the traditional subjects and the environmental theme. The following diagrams describe how the topic of Native American culture was infused into each subject and how each subject relates to other subjects.

FIELDSTON LOWER SCHOOL: CURRICULUM OVERVIEW

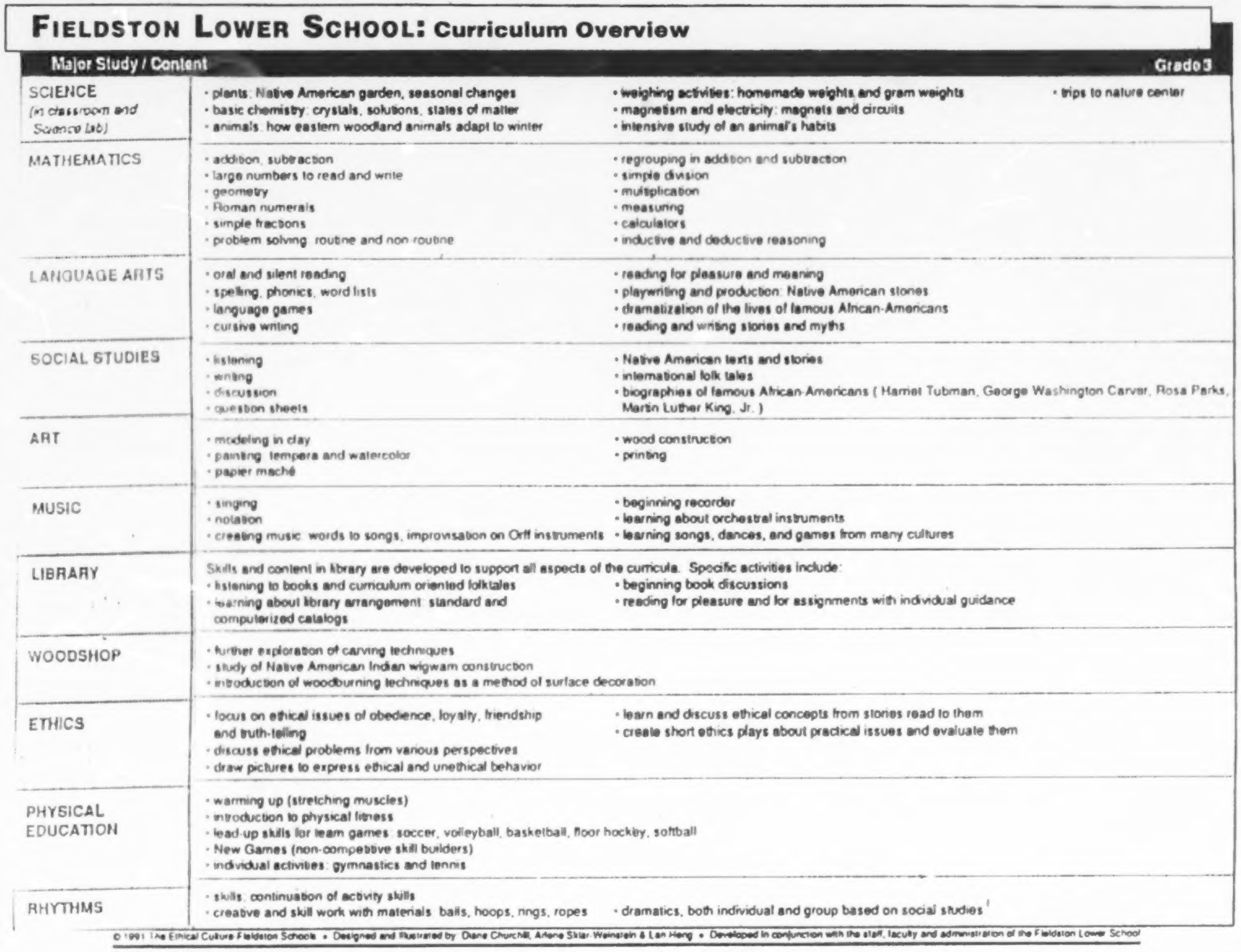
MAJOR STUDY

GRADE 3


NATIVE AMERICANS
LIBRARY SUPPORTS ALL ASPECTS OF THE CORE
MATHEMATICS
WEIGH AND CHART THE DRYING OF CRAB APPLES AND CORN; LIQUID MEASURE OF MAPLE SAP AND SYRUP. USE OF FRACTIONS THROUGH COOKING WITH INDIGENOUS PLANTS. EARLY WAYS OF MEASURING.
LANGUAGE ARTS
NATIVE AMERICAN WORDS. READ, DISCUSS, WRITE MYTHS, LEGENDS, POETRY AND STORIES
CREATIVE ARTS
NATIVE AMERICAN GAMES, SONGS AND DANCES WITH MUSIC; DIORAMAS OF WOOD, LAND SCENES; MAKING KACHINA DOLLS; CREATION OF NATIVE AMERICAN MASKS, SHIELDS; SKETCHING AND CLAY MODELING OF WOODLAND ANIMALS
SPECIAL EVENTS
TAPPING MAPLE TREES FOR SAP, MAKING MAPLE SYRUP. PREPARE FOR AND CELEBRATE NATIVE AMERICAN FEAST.
FIELD TRIPS
INWOOD PARK GREENBURGH NATURE CENTER; MUSEUM OF THE AMERICAN INDIAN; MUSEUM OF NATURAL HISTORY; GREENBROOK SANCTUARY
SOCIAL STUDIES WORKSHOP
SEWING, DYEING, BEADING NATIVE AMERICAN GARMENTS, MAKING DOLL BABIES, LEATHER POUCHES, BEADED HEAD BANDS, TANNING A DEERSKIN, PREPARING FOOD FOR NATIVE AMERICAN FEAST, HARVESTING, DRYING, COOKING
WOOD SHOP
MAKING CRADLE BOARDS, HAND DRILLS, CARVED SPOONS AND BOARDS AND BOWLS, SMALL DUGOUT CANOES WAMPUM STICKS WITH WOODBURNED DECORATIONS. GROUP CONSTRUCTION OF WIGWAM.
SOCIAL STUDIES
READING; FACT FINDING, DISCUSSION, CLASS PROJECTS; WORD STUDY; ALGONQUIN AND IROQUOIS; NATIVE AMERICAN GAMES, WOODLAND ANIMAL RESEARCH STUDY OF WESTERN TRIBES.
SCIENCE
ANIMAL TRACKING, TREE STUDY; ANIMAL STUDY, PLANTS IMPORTANT TO EASTERN WOODLAND NATIVE AMERICANS, PLANT A NATIVE AMERICAN GARDEN.

© 1991 The Ethical Culture Fieldston Schools • Designed and illustrated by: Diane Churchill, ArleneSklar-Weinstein & Lan Heng • Developed in conjunction with the staff, faculty, and administration of the Fieldston Lower School

73 BEST COPY AVAILABLE



FIELDSTON LOWER SCHOOL: Curriculum Overview

Major Study / Content			Grade 3
SCIENCE *(in classroom and Science lab)*	• plants: Native American garden, seasonal changes • basic chemistry: crystals, solutions, states of matter • animals: how eastern woodland animals adapt to winter	• weighing activities: homemade weights and gram weights • magnetism and electricity: magnets and circuits • intensive study of an animal's habits	• trips to nature center
MATHEMATICS	• addition, subtraction • large numbers to read and write • geometry • Roman numerals • simple fractions • problem solving: routine and non-routine	• regrouping in addition and subtraction • simple division • multiplication • measuring • calculators • inductive and deductive reasoning	
LANGUAGE ARTS	• oral and silent reading • spelling, phonics, word lists • language games • cursive writing	• reading for pleasure and meaning • playwriting and production: Native American stories • dramatization of the lives of famous African-Americans • reading and writing stories and myths	
SOCIAL STUDIES	• listening • writing • discussion • question sheets	• Native American texts and stories • international folk tales • biographies of famous African-Americans (Harriet Tubman, George Washington Carver, Rosa Parks, Martin Luther King, Jr.)	
ART	• modeling in clay • painting: tempera and watercolor • papier maché	• wood construction • printing	
MUSIC	• singing • notation • creating music: words to songs, improvisation on Orff instruments	• beginning recorder • learning about orchestral instruments • learning songs, dances, and games from many cultures	
LIBRARY	Skills and content in library are developed to support all aspects of the curricula. Specific activities include: • listening to books and curriculum oriented folktales • learning about library arrangement: standard and computerized catalogs	• beginning book discussions • reading for pleasure and for assignments with individual guidance	
WOODSHOP	• further exploration of carving techniques • study of Native American Indian wigwam construction • introduction of woodburning techniques as a method of surface decoration		
ETHICS	• focus on ethical issues of obedience, loyalty, friendship and truth-telling • discuss ethical problems from various perspectives • draw pictures to express ethical and unethical behavior	• learn and discuss ethical concepts from stories read to them • create short ethics plays about practical issues and evaluate them	
PHYSICAL EDUCATION	• warming up (stretching muscles) • introduction to physical fitness • lead-up skills for team games: soccer, volleyball, basketball, floor hockey, softball • New Games (non-competitive skill builders) • individual activities: gymnastics and tennis		
RHYTHMS	• skills: continuation of activity skills • creative and skill work with materials: balls, hoops, rings, ropes	• dramatics, both individual and group based on social studies	

© 1991 The Ethical Culture Fieldston Schools • Designed and Illustrated by: Diane Churchill, Arlene Sklar-Weinstein & Lan Heng • Developed in conjunction with the staff, faculty and administration of the Fieldston Lower School

Used with permission from the Fieldston Lower School of The Bronx, New York.

BEST COPY AVAILABLE

ADAPTING "OUR WATERY WORLD" FOR USE IN A MATH CLASS

An environmental education activity that can be adapted to fit a variety of traditional classroom subjects is "Our Watery World," which was developed for use in a science curriculum to teach students about the water cycle. The lesson can be easily adapted for use in a variety of other subject areas, including those listed in the table below.

MATHEMATICS

- Present data in various graphs or charts and interpret the data
- Collect and analyze data on water use
- Convert volume to percentages

CHEMISTRY

- Analyze local water quality
- Investigate local treatment systems and their associated chemical processes

LANGUAGE ARTS

- Develop a vocabulary of terms
- Read about water-related issues
- Interview people about water use and quality

Because the activity uses many comparative figures, it can be adapted for use in a mathematics class. For example, students can view a demonstration of the breakdown of fresh water and salt water as described in the "Where the Water Is" (pages 63–64) and then convert water volume to percentages of water in different locations to create a chart that shows the distribution of the earth's water. The data can be used to make various charts and graphs, and in exercises on interpreting information presented in graphs and charts.

OUR WATERY WORLD

OBJECTIVES:
Diagram the water cycle. Explain why the supply of water on Earth is finite. Describe the breakdown of fresh and salt water on earth.

AGES:
All

SUBJECTS:
Science

MATERIALS:
Diagram of the water cycle, one clear gallon container and two small clear jars

Photographs of Earth taken from the perspective of outer space reveal a watery world. This image coincides with a commonly held conception of water abundance. Ours is a water-rich planet. Problems we encounter with water shortages arise due to unequal distribution and unwise use of this life-sustaining resource. This investigation begins with a study of the water cycle. Students will see that the water we use on Earth today is the same water that filled the water jugs of the ancient Egyptians. Water moves in a closed system with no additional inputs from the atmosphere. We will never have more water on Earth than we have today.

THE WATER CYCLE

Start this activity by discussing the cycling of water on Earth. The immensity of the cycle is illustrated in the following figures. (Help your students visualize the size of a cubic mile before discussing these figures. For example, eight city blocks in length, width, and height.)

- At any given moment, an average of 3,100 cubic miles of water droplets and water vapor is distributed throughout the atmosphere.
- Once every 12 days all of the moisture in the air falls as precipitation and is subsequently replaced.
- Ninety-five thousand cubic miles of water are evaporated into the atmosphere annually: 80,000 from oceans and 15,000 from land.
- This is balanced by 95,000 cubic miles of precipitation that fall back to the Earth.

After reviewing the diagram of the water cycle and discussing these figures, ask your students to diagram the global water cycle using arrows and labels to explain how the cycle flows.

WHERE THE WATER IS

In the face of such water abundance, why are there water shortages? The breakdown of fresh and salt water on the planet is outlined on the top of the next page.

Reprinted from *Living Lightly on the Plant* with permission from Schlitz Audubon Center of the National Audubon Society, 1111 East Brown Deer Road, Milwaukee, WI 53217. Copyrighted material. All rights reserved.

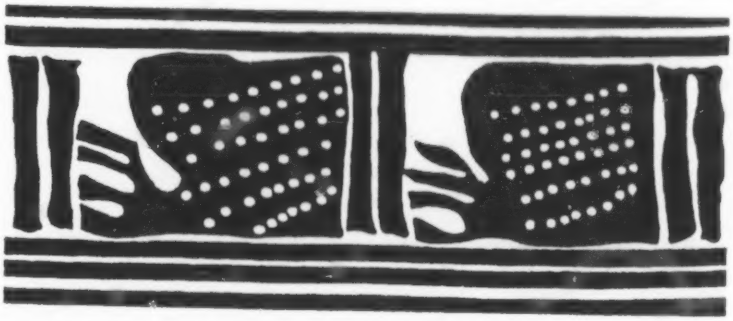
DISTRIBUTION OF EARTH'S WATER

LOCATION	PERCENTAGE
Ocean	97.3
Fresh	2.7
Distribution of fresh water:	
ice caps and glacier	77.2
groundwater and soil moisture	22.4
lakes and wetlands	0.35
atmosphere	0.04
stream channels	0.01

Source: Water Management for Arid Lands In Developing Countries, A.K. Diswas et al, p. 10

The following demonstration could be used to help your students conceptualize the breakdown of fresh and salt water. Fill a large, clear container with 100 ounces or 12.5 cups of water. This represents 100% of the Earth's water. Pour 3 ounces into a small, clear container to roughly represent the percentage of fresh water on the planet. From the three-ounce container, pour 2.25 ounces into a third container. This represents the amount of water in ice caps and glaciers. The water remaining in the second container represents the percentage of water available for our use. You might want to label the containers beforehand so students can refer to the labels as you demonstrate.

If you wish to use metric units in the demonstration, begin with three liters of water to represent the Earth's total water. Then pour 90 milliliters into a second container to reprsent the percentage of fresh water. From the 90 milliliters, pour off 67.5 milliliters into a third container to represent the amount of water in ice caps and glaciers. The amount remaining in the second container represents the amount available to us for fresh water uses.



"Our Watery World" is reprinted from *Living Lightly on the Planet*, with permission from Schlitz Audubon Center of the National Audubon Society, 1111 East Brown Deer Road, Milwaukee, WI 53217. Copyrighted material. All rights reserved. The activity can also be found on pages 222-223 of *Environmental Education in the Schools-Creating a Program the Works!*

ADAPTATION EXAMPLE 4

ADAPTING INTERPRETIVE PROGRAMS

Interpretive programs in parks and protected areas must also be adapted when they are exported from one country to another. Sam Ham, David Sutherland, and Richard Meganck recently wrote a paper titled "Applying Environmental Interpretation in Protected Areas of Developing Countries: Problems in Exporting a U.S. Model" (published in *Environmental Conservation*, Vol. 20, No. 3, Autumn 1993), in which they presented the idea that interpretation should be adapted to the audience, social settings, and biophysical environments in which they take place. The authors believe that although it is possible to export the U.S. **idea** of interpretation within parks and protected areas, the **techniques** and **messages** may be different because the audiences and communication approaches differ from one country to another.

For example, in the United States,

- Protected areas have well-established boundaries and are generally off limits to exploitation for personal and commercial gain;
- Land outside of parks is available for development, which reduces pressure to develop the protected area;
- Therefore, the focus of interpretive programs can be on protecting an area from encroachment from outside pressures and on service and information to middle-class, literate visitors.

By contrast in many other countries,

- Parks are established by law but have no staff or budget;
- High population densities and relatively small land areas mean that excess land is not available to set aside for protection;
- Much of the pressure on protected areas comes from local people who inhabit or who have traditionally inhabited land adjacent to or even within the boundaries of a protected area;
- Therefore, the focus of an interpretive program should be on promoting sustainable interaction between people and their natural environment.

In a situation such as this, an important audience for an interpretive program may be subsistence farming communities living in or adjacent to park boundaries, since their activities directly affect the environmental quality in the park. In order to be effective, interpretive programs, training, and materials imported from other countries must be adapted to address the different perspectives, needs, and values of people who live at a subsistence level.

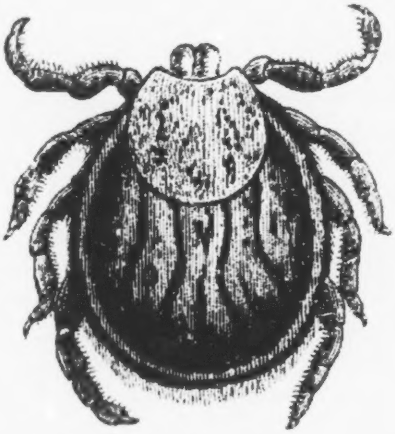
Interpretive programs in parks and protected areas must also be adapted when they are exported from one country to another.

BEST COPY AVAILABLE

It is important to determine the relationship that exists between local people and a park before drawing conclusions about what kind of educational strategy is needed. Working with subsistence families living in or adjacent to protected areas requires learning about their reliance on and use of the land and natural resources. Subsistence families consist of men and women, and girls and boys. Each group has a culturally defined role: Men may use the land for farming or hunting; women collect fuelwood, water, and wild plant products; girls and boys share in some of these tasks. Each person's role needs to be understood so that appropriate educational programs can be designed to reach each group.

Interpretive programs directed toward subsistence families should encourage them to explore and adopt sustainable land-use practices. Instead of using interpretation methodology developed for use in parks in the United States, it may be more appropriate to use agricultural extension programs that address soil conservation, water conservation, and other land-management problems. Extension programs should focus on topics that have an immediate effect on land-use practices, economic development, and the well-being of local men, women, and children; and could include agriculture, personal health, literacy, and numeracy.

Interpretive programs may also need to include ways to reduce the hostility that local people may feel toward areas that have been declared off-limits to development. In the Abruzzo National Park in central Italy, indifferent or hostile rural farming communities living within the park's boundaries became partners with park managers to plan and implement a sustainable development program for the park and the communities. Economic development was the highest priority for the communities, which were losing their young people to jobs in cities. The park established regional interpretive centers within the local communities to encourage park visitors to patronize community businesses. The park also supports quality farming, organic agriculture, and the practice of traditional craft-making. The park logo is placed on specialized local products, which are marketed as originating from within the park. At the least, where local people may be hostile to the existence of a park, interpretive programs might include free passes or field trips that are arranged specifically for local people or outreach programs to bring the park to the communities, if it is not possible to bring the people to the park.



PARTICIPATORY ANALYSIS FOR COMMUNITY ACTION HELPS BUILD UNDERSTANDING

Participatory Analysis for Community Action (PACA) is a methodology to communicate information, identify needs, and lay the groundwork for community action to solve problems. PACA tools such as community mapping, seasonal calendars, daily activity schedules, and needs assessments can help environmental educators design more effective interpretive programs for subsistence families living adjacent to parks. These tools can help educators and community members understand how different groups use or interact with the park or protected area. They provide an avenue for a community's men, women, and children to voice their concerns. This knowledge becomes the foundation for the development of an interpretive program. By using PACA tools to explore a community's needs, environmental education can become a part of a participatory development process for the community. *PACA: Participatory Analysis for Community Action* is available to Peace Corps staff and Volunteers through ICE or an IRC.

Adaptation Example 5

Adapting Environmental Education Comic Books

The Community Forestry Unit of the Food and Agriculture Organization (FAO) of the United Nations publishes a four-part comic book series called *Earthbird*. The series was developed for use with semi-literate school children and to deliver the message of the importance of protecting trees. The central character in the series is the Earthbird, which flies around to visit children in Europe, Africa, Asia, and Latin America. FAO found that the comic book medium was a simple and attractive way to present complex technical information to people who have limited reading skills.

In the original publication, characters, cultural symbols, and environments were deliberately designed so that with limited adaptation, they could be used by children in many countries. The original *Earthbird* was written in English and has been translated by FAO into French and Spanish. However, many organizations wanted to translate the series into local languages to reach even more people. Some translations were done informally without the assistance or involvement of FAO; in other cases, FAO developed formal partnerships with local organizations to complete translations of one or more of the volumes in the series. So far *Earthbird* has been translated into Burmese, Chinese, Lao, Malaysian, Portuguese, Sinhala, Thai, and Vietnamese.

FAO found that the comic book medium was a simple and attractive way to present complex technical information to people who have limited reading skills.

Partnership agreements balance responsibilities between FAO and local institutions. FAO normally agrees to provide local institutions with a film copy of the comic, formatted with empty dialogue balloons that can be filled in with local translations of the original dialogue. FAO requests that the translations follow the original layout, page numbering, and text. In some cases, FAO provides limited financial support for the production and distribution of the translated Earthbird; however, local organizations bear most of the funding responsibility and the work of translation and production. Local organizations also agree to develop a distribution plan and to distribute the translations once they are completed. Local organizations can include their logo and contact information on the translated version along with the FAO logo.

Because of the universal message and presentation of *Earthbird*, most local organizations have done little adaptation beyond translation. However, some people believe that adaptation would make the publication more effective. For example, one adaptation replaced the Earthbird character with an important local deity. In this version the deity speaks to children about the importance of trees, which gives credibility to the message within the target population. Another adaptation is a redesign of houses, trees, and people to make them appear more familiar to the reader. Several adaptations have changed the book from color to black and white, which lowers printing costs and helps make the publication more readily accepted because the style is more familiar to readers. People from some cultures find certain colors to be offensive or carry hidden meaning, which is another reason to consider changing from color to black and white.

FAO has learned a number of lessons about adapting and translating materials through their experiences with the *Earthbird* comic series. For example:

- Rural children appreciate the comic book medium, which also serves as an effective way to transmit complex messages. Comics are effective in promoting a self-help and educational approach to a subject, rather than a lecturing approach.

- *Earthbird's* teacher guides give teachers ideas for other educational activities on the topic of forest conservation. FAO recommends that translators and adapters retain the teacher's pages in any revisions.

- Translations can be poorly done if a translator does not have the necessary knowledge of technical or local vocabulary. It pays to have translations double-checked for accuracy and tested for understanding at the local level.

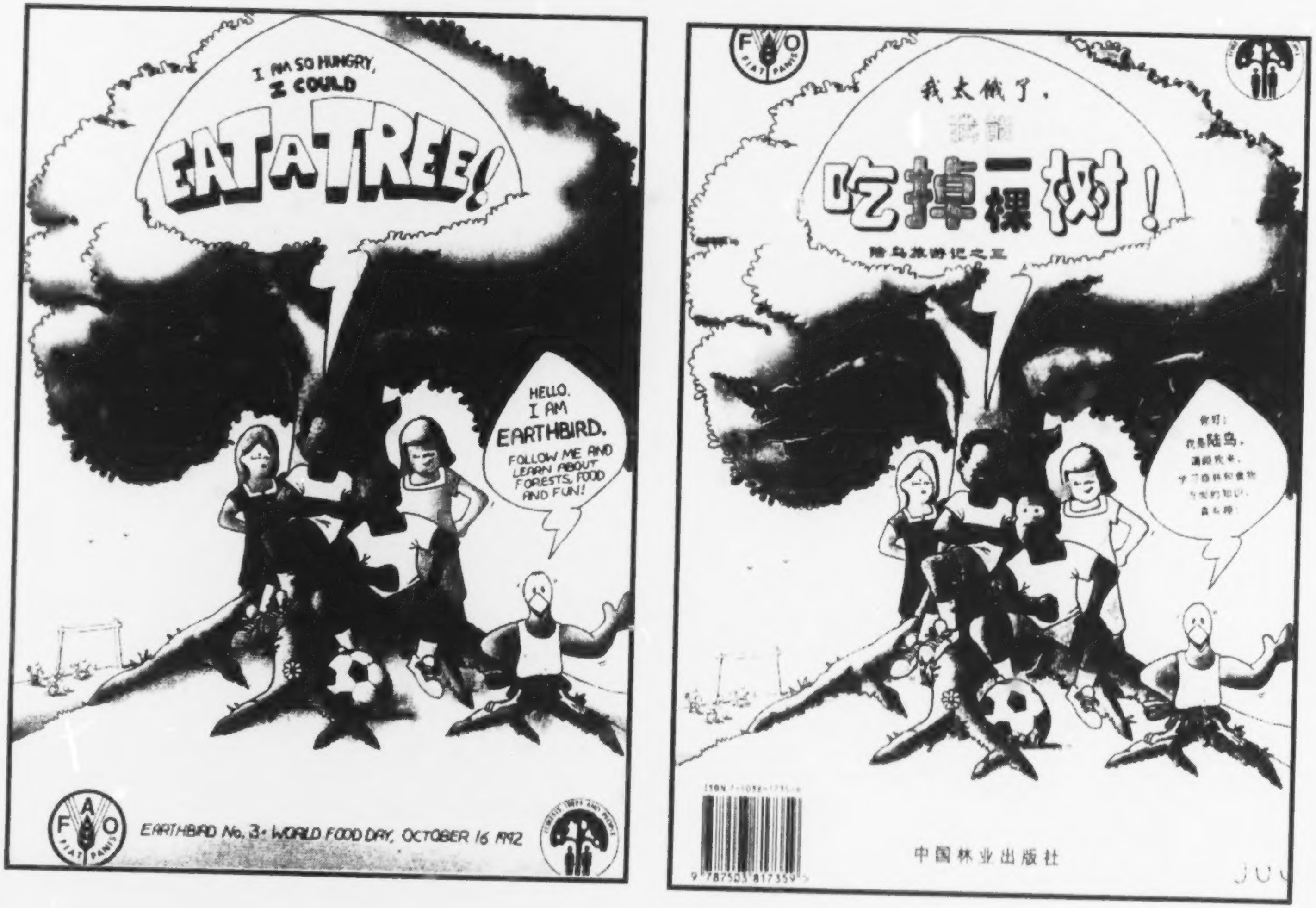
- Visual perceptions can differ from region to region. Images that convey a particular meaning to one group may convey an entirely different meaning to another group. Testing with the target population before finalizing the adaptation is key to avoiding problems.

- Complex technical issues can be difficult to capture in simple language and images. FAO asks partner organizations to try to retain as much of the original text and images as possible, since the original publications strike a balance between scientific substance and simplification.

- Translations and adaptations of *Earthbird* have made it accessible to a wide variety of people and FAO supports further adaptation. Effective, local-level partnership is the essential ingredient to success.

Earthbird is available to Peace Corps Volunteers and staff through ICE. The catalogue reference number is FC204.

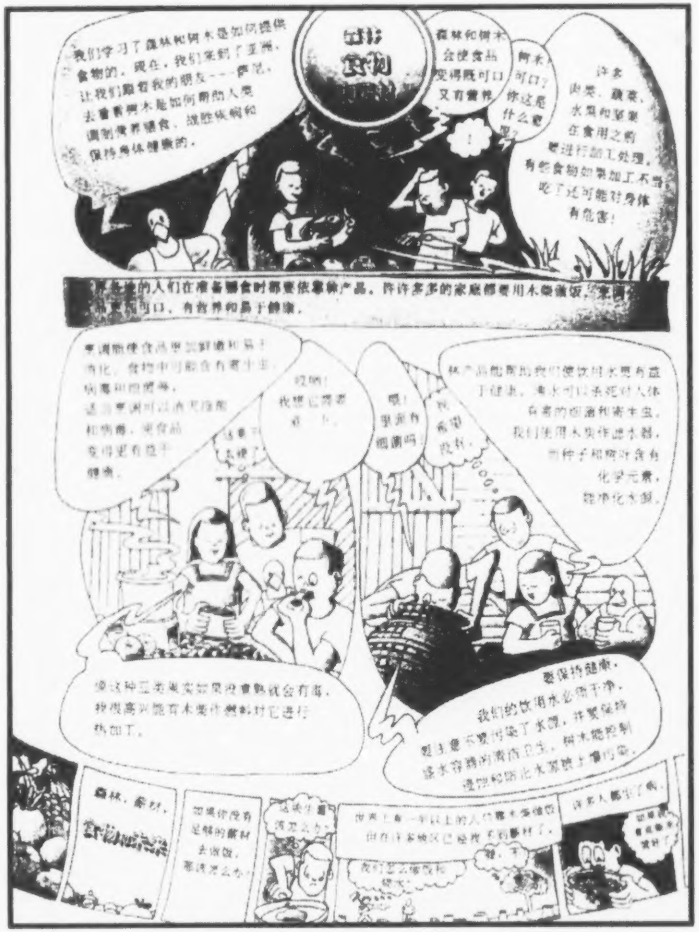
Earthbird is reproduced with permission from FAO, which encourages dissemination of the materials contained in the publication provided that reference is made to the source. For further information about *Earthbird* and other FAO publications, contact the Senior Community Forestry Officer, Forestry Policy and Planning Division, Forestry Department, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome 00100, Italy. Fax: 39-06-5705-5514 or e-mail: fttp@fao.org.

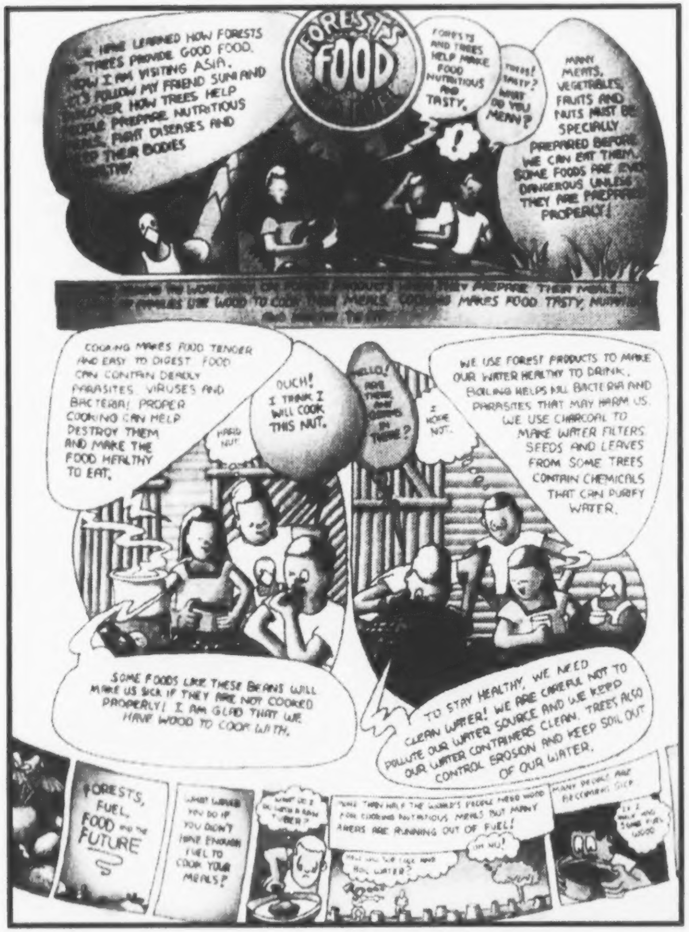

I AM SO HUNGRY, I COULD
EAT A TREE!
HELLO, I AM EARTHBIRD. FOLLOW ME AND LEARN ABOUT FORESTS, FOOD AND FUN!
FAO FIAT PANIS
EARTHBIRD No. 3 • WORLD FOOD DAY, OCTOBER 16 1992
我太饿了，
吃掉一棵树！
陆鸟旅游记之三
你好！我是陆鸟，请跟我来，学习森林和食物方面的知识，真有趣！
中国林业出版社

Earthbird comic book covers in English and Chinese.

BEST COPY AVAILABLE

The same page of an issue of *Earthbird* in English and Chinese.


我们学习了森林和树木是如何提供食物的。现在，我们来到了亚洲。让我们跟着我的朋友——萨尼，去看看树木是如何帮助人类调制营养膳食、战胜疾病和保持身体健康的。
食物
森林和树木会使食品变得既可口又有营养
许多肉类、蔬菜、水果和坚果在食用之前要进行加工处理。有些食物如果加工不当吃了还可能对身体有危害！
要保持健康，我们的饮用水必须干净。
许多人都生病了。


WE HAVE LEARNED HOW FORESTS AND TREES PROVIDE GOOD FOOD. NOW I AM VISITING ASIA. LET'S FOLLOW MY FRIEND SUNI AND DISCOVER HOW TREES HELP PEOPLE PREPARE NUTRITIOUS MEALS, FIGHT DISEASES AND KEEP THEIR BODIES HEALTHY.
FORESTS FOOD
FORESTS AND TREES HELP MAKE FOOD NUTRITIOUS AND TASTY.
FOOD! TASTY? WHAT DO YOU MEAN?
!
MANY MEATS, VEGETABLES, FRUITS AND NUTS MUST BE SPECIALLY PREPARED BEFORE WE CAN EAT THEM. SOME FOODS ARE EVEN DANGEROUS UNLESS THEY ARE PREPARED PROPERLY!
COOKING MAKES FOOD TASTY,
COOKING MAKES FOOD TENDER AND EASY TO DIGEST. FOOD CAN CONTAIN DEADLY PARASITES, VIRUSES AND BACTERIA! PROPER COOKING CAN HELP DESTROY THEM AND MAKE THE FOOD HEALTHY TO EAT.
HARD NUT.
OUCH! I THINK I WILL COOK THIS NUT.
HELLO! ARE THERE ANY GERMS IN THERE?
I HOPE NOT.
WE USE FOREST PRODUCTS TO MAKE OUR WATER HEALTHY TO DRINK. BOILING HELPS KILL BACTERIA AND PARASITES THAT MAY HARM US. WE USE CHARCOAL TO MAKE WATER FILTERS. SEEDS AND LEAVES FROM SOME TREES CONTAIN CHEMICALS THAT CAN PURIFY WATER.
SOME FOODS LIKE THESE BEANS WILL MAKE US SICK IF THEY ARE NOT COOKED PROPERLY! I AM GLAD THAT WE HAVE WOOD TO COOK WITH.
TO STAY HEALTHY, WE NEED CLEAN WATER! WE ARE CAREFUL NOT TO POLLUTE OUR WATER SOURCE AND WE KEEP OUR WATER CONTAINERS CLEAN. TREES ALSO CONTROL EROSION AND KEEP SOIL OUT OF OUR WATER.
FORESTS, FUEL, FOOD AND THE FUTURE
WHAT WOULD YOU DO IF YOU DIDN'T HAVE ENOUGH FUEL TO COOK YOUR MEALS?
MORE THAN HALF THE WORLD'S PEOPLE NEED WOOD FOR COOKING NUTRITIOUS MEALS BUT MANY AREAS ARE RUNNING OUT OF FUEL!
OH NO!
MANY PEOPLE ARE BECOMING SICK.

BEST COPY AVAILABLE

ADAPTATION EXAMPLE 6

ADAPTING NONFORMAL YOUTH DEVELOPMENT PROGRAMS

The 4-H program is a nonformal youth development program that originated in the United States in the late 1890s to build skills among farm youth. Today the 4-H program has grown to become the largest youth development program in the United States. It has expanded to address the needs of youth in the 1990s by dealing with urban and suburban youth issues, and has been exported to other countries around the world. The mission of 4-H is to help young people meet their full potential. To achieve this, 4-H provides community-based experiential learning opportunities, helps youth develop skills that will benefit them throughout their lives, fosters leadership and volunteerism in young people and adults, builds internal and external partnerships for programming and funding, and strengthens families and communities.

In the 1960s Peace Corps and 4-H collaborated to introduce the 4-H program into Latin America. There are also programs in Africa, Asia, and Europe. The success of 4-H in other countries has been mixed because of a variety of factors, but if adapted to the local situation, the model can provide a useful framework for youth development and nonformal environmental education programs in other countries. The strengths of the 4-H model that can be carried over to youth development programs in other countries include those that follow.

EMPHASIS ON COMMUNITY LEADERSHIP

Volunteer adult and youth leaders manage after-school and weekend 4-H youth clubs and work closely with the local extension agency, which provides materials and activities, training, technical assistance, and, in some cases, limited financial support. The adult leaders are normally parents or other community members who receive limited training from the extension service and use prepared activity plans that are developed by a national network of 4-H-affiliated extension services, which are normally located at agricultural universities.

FOCUS ON EXPERIENTIAL LEARNING

4-H focuses on experiential learning, or "learning-by-doing." Rather than learning facts and theory through lectures, 4-H members learn by raising their own animals, growing their own gardens, making their own compost, collecting their own information, and practicing their own experiments.

Rather than learning facts and theory through lectures, 4-H members learn by raising their own animals, growing their own gardens, making their own compost, collecting their own information, and practicing their own experiments.

FOCUS ON LINKING YOUTH DEVELOPMENT WITH COMMUNITY DEVELOPMENT

An important focus area for 4-H is community youth development, which recognizes young people as equal partners and valuable resources in building healthy communities and in identifying and solving community problems. The issues and problems of young people are inextricably linked to the problems of the community as a whole, and youth and adult partnerships are the means by which positive youth and community development occur.

FOCUS ON AGRICULTURE AND ENVIRONMENT

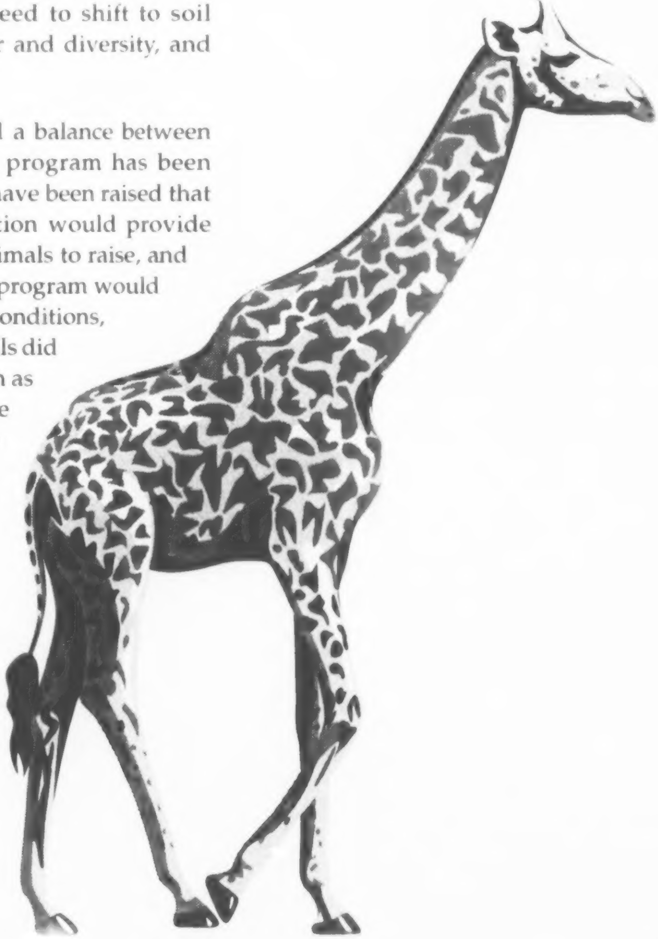
The 4-H program has traditionally addressed the topics of agriculture and environment. A variety of lesson plans and activities have been developed around problem-solving in these areas.

FOCUS ON DEVELOPING LIFE SKILLS

The 4-H program also focuses on building "life-skills" such as decision-making, planning, budgeting, and conflict resolution, in addition to teaching technical skills.

In spite of these strengths, experience shows that in order to be successful, the 4-H program must be adapted to a local setting when it is exported to other countries. Some ways that the program might need to be adapted include the following:

- Activities and lesson plans developed in the United States that address animal production tend to focus on preparing animals for show, because animal shows at county fairs are important learning experiences. However, in order to be effective in other countries, the emphasis must be changed. While animal production and marketing may be important skills to develop, in other countries the emphasis may need to shift to soil conservation, conservation of plant cover and diversity, and water conservation and quality.
- In some cases it has been difficult to find a balance between education and profit-making when the program has been exported to other countries. Expectations have been raised that a government or development organization would provide funding or loans for youth to purchase animals to raise, and that the young people participating in the program would reap significant profits. Because of many conditions, either the funding for the purchase of animals did not materialize, the profits were not as high as expected, or the funding could not be sustained over any period of time. To be successful, the program should be based on a realistic approach to profit-making and investment or otherwise modified to deal with this issue.



89

- In most countries, including the United States, an extension agent cannot personally manage all of the potential youth development groups in his or her area, which makes it important to develop community and youth leaders for 4-H clubs. However, this approach requires that resources and effort be devoted to developing local capacity to manage the program. This may be a considerable challenge in rural areas of developing countries, but if volunteer leadership can be developed, the program will have a strong foundation of community support. It may require a stronger emphasis on capacity building for leaders and closer affiliation with existing networks within a community.

- In some countries, the 4-H program carries negative connotations because it was affiliated with past government regimes. This history should be thoroughly investigated before new efforts are started, and the program modified either in name or practice to avoid too close of an association with past failures.

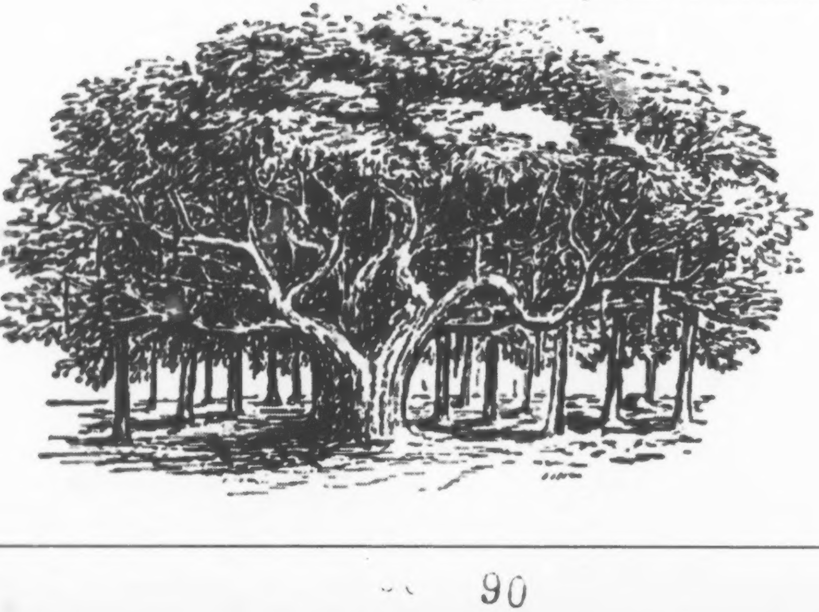
In some countries, the 4-H program carries negative connotations because it was affiliated with past government regimes.

The sample 4-H lesson plan on the following pages, "Your Turn to Teach," is an activity in which older or more advanced youth become leaders and teachers of others. The activity is one of the later lessons in a four-part series on sheep production. This activity and others like it could be used in several ways:

- It could be adapted to focus on adult or youth leaders as a tool to promote teaching skills and build capacity for experiential teaching;

- It could be used as an example of how experiential learning methods can be incorporated into lesson plans and activities and used to enhance locally developed materials that may not have the desired "learning-by-doing" focus;

- It could be adapted to focus on another issue, such as sustainable agricultural practices or soil conservation.



Reprinted with permission from *Your Turn to Teach* published by the Center for Youth Development, University of Minnesota.

Your Turn to Teach

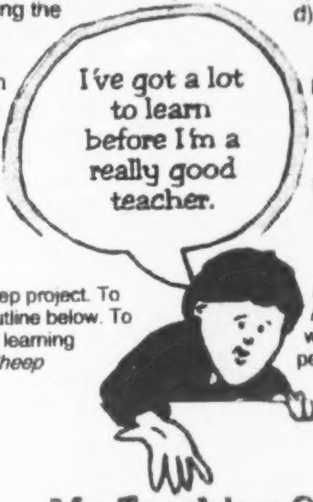
Life Skill: Leading self and others
Project Skill: Teaching others
What To Do: Design and teach a lesson on a sheep topic

You may not realize it, but teaching others is one of the most important leadership skills. Good leaders teach others what they know as well as listen to others. This activity will help you develop good teaching skills by practicing the experiential learning process.

Experiential learning starts with the learner being active, doing an activity or experience (not listening to a speech). Then the learner,

a) shares what happened
b) talks about what is important
c) figures how the activity applies to her or him
d) decides what ideas can be applied in the future

Do you recognize this process? It is the one you have been using to learn in these activity guides. Now you have a chance to use it to teach someone else something you know!

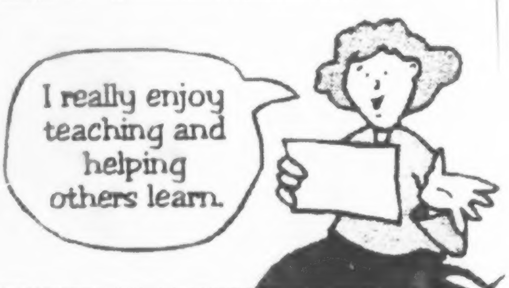

I've got a lot to learn before I'm a really good teacher.

Do the Activity

Choose a topic related to the sheep project. To prepare to teach, complete the outline below. To learn more about the experiential learning process, see page 5 of the *4-H Sheep Group Activity Guide* or page 2 of this guide. After you have designed your lesson, discuss it with your helper. Then try it with three or more people as learners.

My Teaching Outline

1. **Experience (Doing)**
   Describe the experience or activity learners will do before they are told or shown how to do it.
2. **Share (What happened?)**
   Write questions to ask the learners about their experience and their reaction to the activity after they have completed it.
3. **Process (What's important?)**
   Write a question to ask the learners about what they think is the most important thing they learned from the activity.
4. **Generalize (So what?)**
   Write a question that asks how the experience relates to their lives.
5. **Apply (Now what?)**
   Write a question to ask how they could apply what they learned to a different situation.


I really enjoy teaching and helping others learn.

BEST COPY AVAILABLE

Talk it Over

Share with your helper

- How did you feel using the experiential process?
- How did the learners respond to your teaching?
- Did they learn from it?

Process What's Important

Why is it important for the learners to try to do something first before being told or shown how to do it?

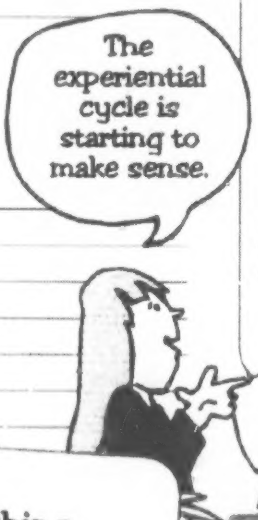
Generalize to Your Life

When have you learned something by trying it first and then discussing what you did

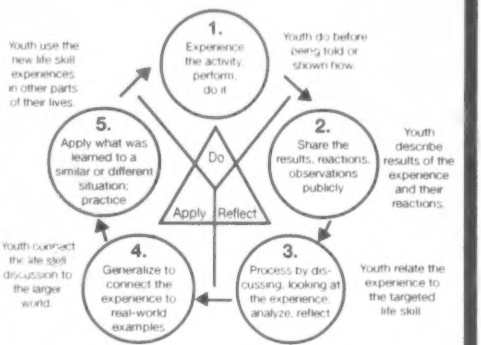
Apply What You Learned

Where else can you use the experiential learning process to teach others?

Date ______ **Initial** ______


The experiential cycle is starting to make sense.

Experiential Learning Cycle


1.
Experience the activity; perform, do it
Youth do before being told or shown how.
2.
Share the results, reactions, observations publicly
Youth describe results of the experience and their reactions.
3.
Process by discussing, looking at the experience; analyze, reflect
Youth relate the experience to the targeted life skill.
4.
Generalize to connect the experience to real-world examples
Youth connect the life skill discussion to the larger world.
5.
Apply what was learned to a similar or different situation; practice
Youth use the new life skill experiences in other parts of their lives.
Do
Apply
Reflect

Good Teaching

What is good teaching? First, good teaching depends on the learners as much as the teacher. Good teaching depends on what the learners already know (a teacher builds on that), what the learners want to know (a good teacher uses that to motivate the learners) and how they learn best. Second, people will remember more of what is taught to them if they are involved. This kind of teaching takes longer than lecturing, but it is usually worth it because the learners remember more.

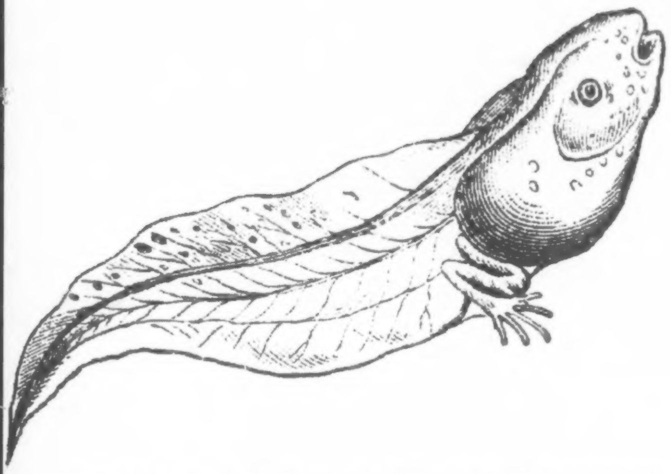
More challenges

1. Teach someone how to teach using the experiential method. See if you can allow your learner to discover the process rather than being told or shown what it is.
Date ______ **Initial** ______

2. Observe how a teacher at school teaches. Are the steps of the experiential process followed or some other method? Describe what you observe to your helper.
Date ______ **Initial** ______

BEST COPY AVAILABLE

TRAINING EDUCATORS ABOUT ADAPTION



CONDUCTING AN ENVIRONMENTAL EDUCATION WORKSHOP

We recommend addressing the topic of adapting materials during environmental education workshops and in-service training programs. The following four-day workshop design uses the 4MAT approach to lesson planning, a four-step design that addresses a variety of learning styles and covers motivation, information, practice, and application. If it is not possible to hold a four-day workshop given time or budget constraints, consider using the 4MAT approach to design a shorter workshop, including sessions in motivation, information, practice, and application.

This workshop design should be modified to meet specific needs that have been identified through an assessment of the participants, and the specific project goals and objectives of the environmental education program. However, some principles should be retained regardless of the final design.

- **PARTICIPANT CENTERED.** Look to the participants as leaders at every opportunity. An important first step is to base the workshop on a needs assessment. The second step is to provide opportunities for participants to share their experiences with each other.

- **ENCOURAGE NETWORKING.** Provide a forum for people to learn about important environmental education resources and people they can work with in the future. This means getting key people to participate in the workshop who represent programs that will be useful for participants.
- **FOCUS ON MATERIALS.** Concentrate on introducing and working with materials that can be used by participants when they return home. This means that pre-work will need to be done to identify key materials and funds raised to ensure that participants will have copies of the materials to take home.

Environmental education workshops will be successful if you follow these key elements:

> ***Recognize the accomplishments of participants by providing certificates, environmental education materials, and continuing education credit, or by other ways.***

- Design the workshop on the basis of a prior assessment of the needs of the participants.
- Include host country national counterparts in workshops for Peace Corps Volunteers and staff, if at all possible.
- Develop, support, and conduct the workshop through partnership with key environmental education organizations.
- Recognize the accomplishments of participants by providing certificates, environmental education materials, and continuing education credit, or by other ways.
- Identify key resource needs and make commitments well ahead of time, including
    - a ministry of education or environment representative to open the training
    - speakers and other resource people
    - a field trip site and agenda.
- In addition to doing daily and final evaluations of the workshop, conduct follow-up monitoring a few months later to evaluate how well the workshop met its goals in the long run.
- Set up a resource table and have materials available for review throughout the workshop. Materials may come from a variety of sources, including national and international organizations, and those that have been developed or adapted by Peace Corps Volunteers.
- Introduce a few key resources that participants can take home for their own use.

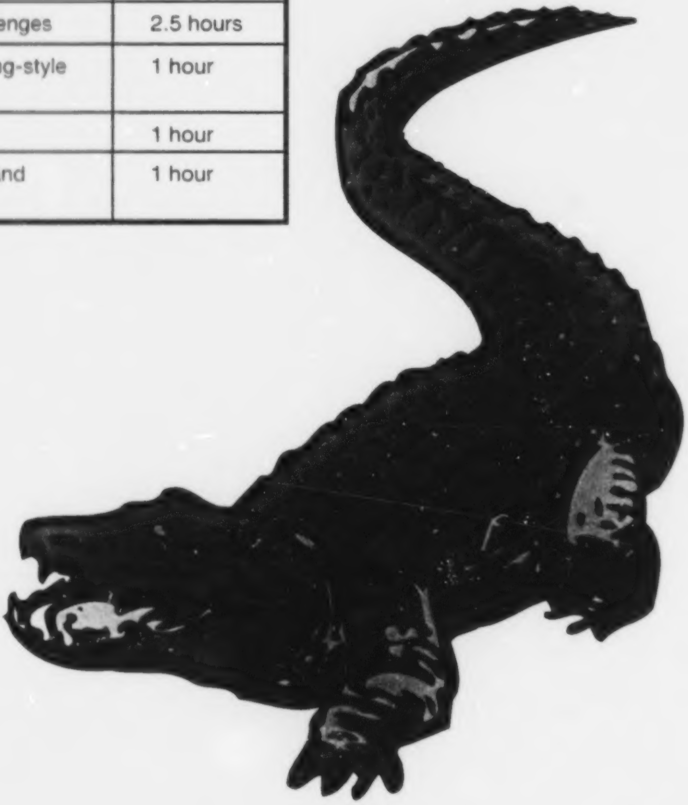
For more information about how to design and conduct environmental education workshops, see *Designing Effective Workshops*, by Judy A. Braus and Martha C. Monroe, which is part of the EE Toolbox.

WORKSHOP TIMETABLE AND SCHEDULE

DAY ONE

The overall objective of the first day is to motivate participants. Participants share their professional and environmental successes and challenges. Facilitators introduce the workshop goals and agenda, negotiate workshop norms, introduce learning-style theory, and introduce environmental education materials. Adaptation is addressed by introducing environmental education materials and conducting a quick review to familiarize participants with the materials and begin the process of screening those that have potential for use.

Session	Time
Opening ceremony with Peace Corps and ministry representatives	0.5 hour
Present workshop goals and agenda, and negotiate workshop norms	0.5 hour
Environmental education successes and challenges	2.5 hours
Introduce environmental education and learning-style theory	1 hour
Plan an environmental education program	1 hour
Introduce environmental education materials and conduct a quick review	1 hour



DAY TWO

The overall objective for the day is to inform participants about environmental issues in their country and environmental education programs, issues, and materials.

Topics for the day include discussing environmental issues in the country; participant-led presentations of environmental education activities; and presentations by representatives of organizations that are conducting environmental education activities, which could serve as important resources for workshop participants. Adaptation is addressed through a session on planning for successful adaptation of environmental education materials, with a comparison and analysis of case studies.

Session	Time
Review and motivation	0.5 hour
Identify local environmental issues through participatory group activities	1.5 hours
Local resources: guest speakers from environmental education organizations	1.5 hours
Environmental education lessons and activities led by workshop participants	1.5 hours
Planning for successful adaptation of environmental education materials	1.5 hours

OPENING A SPACE IN THE AGENDA

A participatory technique called "Open Space" can be used during the information segment of the workshop rather than having a fixed agenda developed by the facilitators. "Open Space" allows participants to take leadership roles in the workshop by establishing their own agenda for the day and convening small-group sessions to address topics of interest to them (see *Open Space* and *Tales from Open Space*, by Harrison Owen, for more information about how to do this). Outside experts and resource people can be invited to participate for the day and encouraged to participate in developing the agenda and convening sessions on their areas of expertise. One doesn't need to be an expert to convene a session during "Open Space," one just needs an issue to discuss with other participants, or information to share. "Open Space" has a method to it, so read the books and talk to someone who has participated in it to learn how it works.

96

DAY THREE

The overall objective of the day is that participants see environmental education in practice through a field trip. Adaptation can be included in the processing segment of the day by asking how participants would adapt the field trip for use in their own setting.

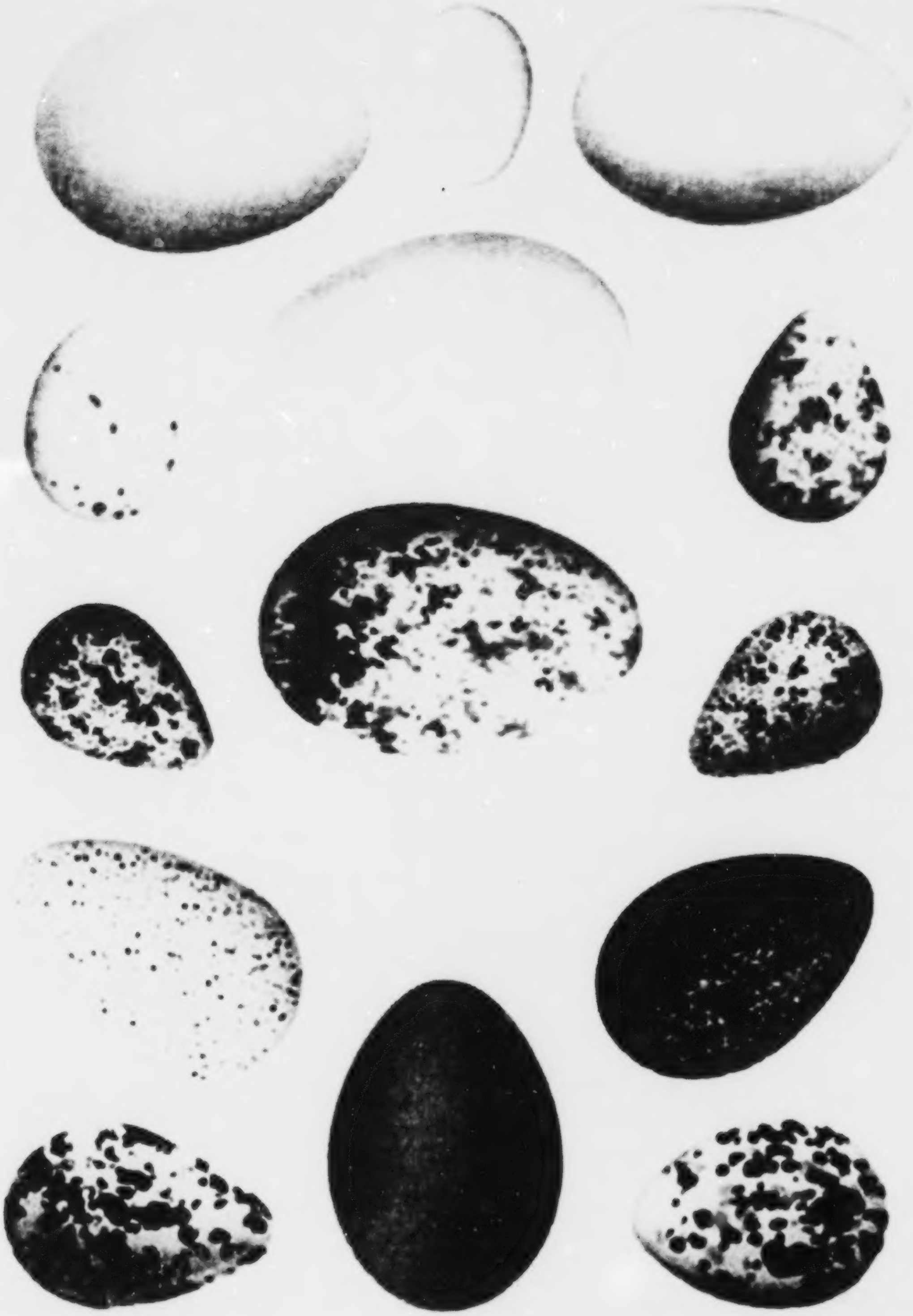
Session	Time
Review and motivation	0.5 hour
Prepare for the field trip	0.5 hour
Field trip with cooperative learning and research tasks	4 hours
Process activities based on the field trip, including problem-posing, critical thinking, and questioning techniques	1.5 hours

DAY FOUR

The overall objective of the day is that participants begin to apply their environmental education skills in their own educational settings. The focus is on getting to know the community; adapting environmental materials to the local reality; and action planning, including identifying barriers and solutions. Adaptation is addressed through the session "Adapting Environmental Education Materials to Your Local Reality," and in the session on planning next steps.

A training session on the topic of "Community Mapping" is found in *PACA: Participatory Analysis for Community Action*, published by Peace Corps ICE.

Session	Time
Review and motivation	0.5 hour
Community mapping: A tool for getting to know your community	1 hour
Adapting environmental education materials to your local reality	2 hours
Action planning for environmental education Next Steps: barriers and solutions	1.5 hours
Evaluations and closing ceremony	0.5 hour



SESSION

PLANNING FOR SUCCESSFUL ADAPTATION OF EE MATERIALS

(This session was adapted from a session called "Planning an Environmental Education Program," presented by Joan Haley at the Environmental Education TIPS Training-of-Trainers for Eastern and Central Europe, held in Poland, in 1996.)

OVERVIEW

By working with several case studies, participants will develop an understanding of the importance of careful planning in adapting materials.

PURPOSE

- To introduce the background to materials adaptation, including adaptation issues and a systematic process for adaptation; and
- To analyze case studies of adaptation successes and failures.

TIME

1.5 to 2 hours

MATERIALS

- Enough copies of adaptation case studies for each small group to have one, or develop your own case study based on local examples.
- Blackboard or newsprint
- Chalk or markers

FROM THE FORMS AND HANDOUTS SECTION OF THIS MANUAL:

- A Systematic Approach to Adaptation written on a blackboard or newsprint
- Adaptation Possibilities written on a blackboard or newsprint
- Principles of Successful Adaptation written on a blackboard or newsprint

STEPS

Quickly review the list of environmental education materials being introduced at the workshop. Point out the region or country of origin of each document, and indicate that many of the documents, if not all of them, were developed for use in another country or region than where the educators work. Since workshop participants have had an opportunity to look at the materials, ask them what kind of issues could arise when materials intended for use in one place are being developed for use in another. Capture participants' ideas on a blackboard or newsprint. During a recent Peace Corps environmental education conference in Eastern Europe, participants discussed the kinds of issues that could arise when importing materials from one place for use in another, and generated the following list:

- Materials do not refer to local issues and organizations.
  Information may be overwhelming to people with a limited background in the subject area.
- Materials may be in English or another language that is not native to the people. How are they translated?
- Dominant, preferred learning styles may differ from one country to another.
  Teaching methodology may be new and unfamiliar (e.g., cooperative learning).
- How does one adapt materials for older or younger age groups?
- Who will pay for adaptation and translation?
- What are the copyright issues and how should they be addressed?
- How should the materials reflect differences in culture, dress, and style?
- Different places have different access to technologies to deal with environmental issues.
- Consider the visual presentation of people and materials such as social differences, community design, clothing, houses, and physical features of people.
- Values about how we relate to the environment differ from one country to another.

There may be good reasons why "imported materials" may be useful in places where limited materials exist. Ask for participants' ideas about why it might be important to introduce materials from another place and capture them on newsprint or a blackboard. Ideas may include the following:

- Environmental problems need to be addressed through education, but locally developed materials either do not exist or are of low quality.
- Imported environmental education materials are available.

- Many documents have been thoroughly researched, tested, and evaluated, and include some of the best information available anywhere. They focus on learner analysis of environmental issues, they are easy for educators to use, they encourage integration of activities into an existing curriculum or other environmental education program, and they use experiential learning techniques to engage students and participants.
- The ability of organizations and individuals to develop new materials may be limited by the skills and expertise of the educator, time available to devote to materials development, and availability of funds and resources.
- There is no guarantee that locally developed materials will be relevant and appropriate, especially if they were developed by people with limited experience in materials development.

Materials are not inherently impossible to introduce; however, effective introduction of materials requires thoughtful adaptation.

Adaptation should begin with an environmental education plan that includes identifying the environmental problem, identifying the technical solutions to the problem, identifying the audience to address the problem, identifying the message to be delivered through an educational strategy, selecting the appropriate educational strategy to use, implementing the strategy, and evaluating the strategy.

Adaptation can then take place within the context of overall educational goals and objectives. For educators in a formal school system, the environmental education plan may be largely determined by the curriculum. For people working in extension services or protected areas, overall planning documents may provide important guidance for the education plan.

Once a plan has been developed and appropriate materials have been identified, adaptation can begin. A systematic approach to adaptation can help overcome the issues that are inherent in bringing materials from one place for use in another. Review A Systematic Approach to Adaptation, (see the Forms and Handouts section of this manual for a copy) which can be written on a blackboard or newsprint.

Discuss participants' observations about this approach to adaptation.

For further information, review and discuss Adaptation Possibilities (see the Forms and Handouts section of this manual), which can be written on newsprint.

Tell participants that they will now work in small groups with a case study of a real adaptation. Divide the group into smaller groups of three to seven people. Each group's role is to develop a strategy for effective adaptation in the situation presented in the case study, and to present the strategy to the full group. Use Systematic Approach to Adaptation and Adaptation Possibilities (in the Forms and Handouts section of this manual) to help develop the strategy. Give the groups 20 minutes to develop their strategy and prepare a three- to five-minute presentation.

Give each group a copy of the TOP HALF of the case study. Be careful to NOT reveal the "what really happened" part of the case study.

Reconvene the full group and have each small group present their strategy, beginning with a reading of the case study. If different groups have the same case study, report out all of the strategies for the same case study, and then reveal the actual outcome of the case by reading "what really happened."

Suggested follow-up questions:

1. How did your group proceed with the task?
2. Which steps of the systematic approach to adaptation did you concentrate on most?
3. Did you skip any steps? If so, why?
4. What were some of the challenges your group faced? Were these challenges related to planning or to the adaptation itself? (The facilitator should note that the planning process is often the most challenging part of adaptation.)
5. Why is it important to develop a strategy before beginning to adapt materials?
6. What are the keys to successful planning?

Capture the responses to the last question on newsprint under the heading "Principles of Successful Adaptation." Be sure that the list includes at least the following elements. Add any that are missing after the small group presentations.

PRINCIPLES OF SUCCESSFUL ADAPTATION

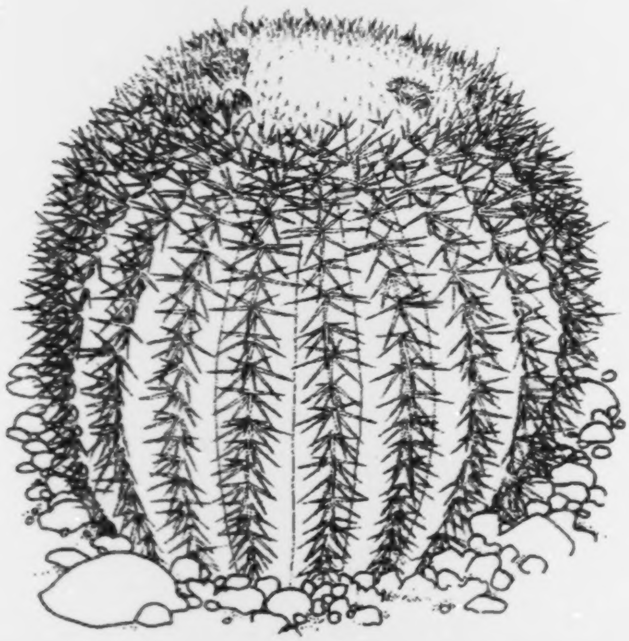
1. Build your adaptation on the foundation of an environmental education plan with clear objectives for what you hope to accomplish.
2. Collaborate in developing and implementing the education program and in adapting materials:
    - Build partnerships with people and organizations who can support your efforts.
    - Build on the knowledge of others.
    - Find the experts—make a list of possible sources and contacts, and follow up with meetings.
    - Promote interdisciplinary links among technical sectors and between educators and scientists.
3. Identify, screen, and select the best environmental education documents to adapt. Look widely for resources, screen them to find those that will most likely meet your needs, and then select those to work on further.
4. Conduct an in-depth evaluation of the selected materials to find those that are the highest quality and will best meet the needs of your program. Adaptation takes time and energy, and you want to invest effort on only the best materials that are available.
5. Give credit where credit is due by recognizing the original authors and obtaining clearance to use copyrighted materials.

6. Approach adaptation systematically, once materials have been selected. Follow these steps:
   - Identify adaptation partners.
   - Identify adaptation issues.
   - Identify what specific steps are needed to carry out the adaptation and who will be responsible for each.
   - Complete a draft version of the adaptation and test it.
7. Build in an evaluation and "try and try again":
   - Incorporate a review of the adaptation in draft form.
   - Test materials before finalizing them.
   - Don't make a large financial investment until materials have been tested.
8. Recognize that adaptation is a question of scale but that the same concepts of adaptation apply, whether a single lesson or a complete book of materials is being adapted.
9. Be aware that unadapted materials in the wrong setting can be demoralizing and unproductive. Your efforts to adapt good materials to your community are worth your effort.

APPLICATION

Pose a final question or two to encourage reflection. For example, ask participants:

1. What did you learn in the session that you found new and important?
2. From your perspective, what did you find to be the main issues in adapting materials?



ADAPTATION CASE STUDY ONE

ADAPTING COLORFUL WALL POSTERS IN HUNGARY

THE CHALLENGE

Colorful wall posters on environmental themes are not widely available in Hungary, so teachers welcome them for both their educational value and to beautify the classroom. Some posters that provide in-depth information about water usage and factors that affect water quality in an appealing and meaningful way were meant for use in their original setting: cities and suburbs in the United States. The posters show colorful, cartoonlike diagrams of American cities and towns, and depict the sources and uses of water in those settings as well as the purification methods in a display that is similar to a water cycle. The back of the original poster is filled with text and facts about water usage in the United States. Because water quality is an important issue in Hungary, these posters could be introduced into Hungary. What steps will you take to make effective use of these posters in Hungary?

> ***Colorful wall posters on environmental themes are not widely available in Hungary, so teachers welcome them for both their educational value and to beautify the classroom.***

WHAT REALLY HAPPENED

The colorful wall posters were translated into Hungarian and reproduced at a significant cost. Funding was provided by an international development organization. Unfortunately the posters were not adapted to the local setting before they were translated and reproduced, but retained their focus on American culture and water issues. None of the background information found on the original version was translated into Hungarian; the backs of the Hungarian posters are blank. The result is that while the posters decorate classrooms using the general theme of protecting water quality, they do not provide relevant educational information for Hungarian teachers or students, are confusing to Hungarians who do not recognize the setting and issues, and probably do not contribute knowledge that will result in better water quality in Hungary.

This case study was developed from communications with Andrea Deri, former Associate Peace Corps Director in Hungary, in 1996.

INTRODUCING WILDLIFE ACTIVITY GUIDES TO BRAZIL

ADAPTATION CASE STUDY TWO

THE CHALLENGE

Conservation of Brazil's native wildlife species is an important issue for many Brazilians because species are disappearing because of loss of habitat through farming, logging, and other kinds of development. Environmental educators in Brazil were introduced to activity guides that were developed for use in North America, but that focused on conservation of North American wildlife. The guides are well written, easy to use, employ student-centered teaching methodology, and are relatively free of bias. Brazilian environmental educators want to use the guides in Brazil as a part of an education strategy to help combat the loss of wildlife species. What steps will you take to make effective use of these activity guides in Brazil?

WHAT REALLY HAPPENED

Sam Ham and Lizeth Castillo reported that the activity guides that were developed in the United States were translated and exported to Brazil. The guides dealt with North American wildlife species such as grizzly bears and timber wolves, species that do not exist in Brazil. The guides were not adapted before they were introduced to Brazilian teachers; the original text was simply translated into Portuguese. While the Brazilian children who saw the guides probably enjoyed learning about exotic wildlife species, the guides did not contribute to childrens' knowledge and understanding of their own wildlife species. The materials did nothing to develop pride in Brazil's wildlife heritage nor provide necessary information to contribute to conservation of Brazilian wildlife. As Ham and Castillo point out, it seems logical that before a country can prudently manage its wildlife, citizens must be knowledgeable about their own wildlife species.

Conservation of Brazil's native wildlife species is an important issue for many Brazilians because species are disappearing due to loss of habitat through farming, logging, and other kinds of development.

This case study was developed from "Elementary Schools in Rural Honduras: Problems in Exporting Environmental Education Models from the United States," by Sam H. Ham and Lizeth Castillo, published in the Journal of Environmental Education, 1990;21(4):27-32.

ADAPTATION CASE STUDY THREE

A GUIDE TO FRESHWATER MACRO-INVERTEBRATES

THE CHALLENGE

Environmental educators in Hungary are eager to have a Hungarian guide to identify freshwater macro-invertebrates, which are important indicators of water quality. Such a guide is important because of the growing interest in water quality; interest among educators in hands-on field studies, especially investigating water quality; and the developing network of community groups that monitor water quality of local creeks and rivers. Unfortunately, no locally developed key is available to address these needs. The original of *A Key to Freshwater Macro-Invertebrates* was developed in Britain by the Field Studies Council and is identified as an excellent resource. What steps will you take to make effective use of this environmental education material in Hungary?

Peace Corps and two environmental NGOs cooperated to adapt the macro-invertebrate guide for Hungary.

WHAT REALLY HAPPENED

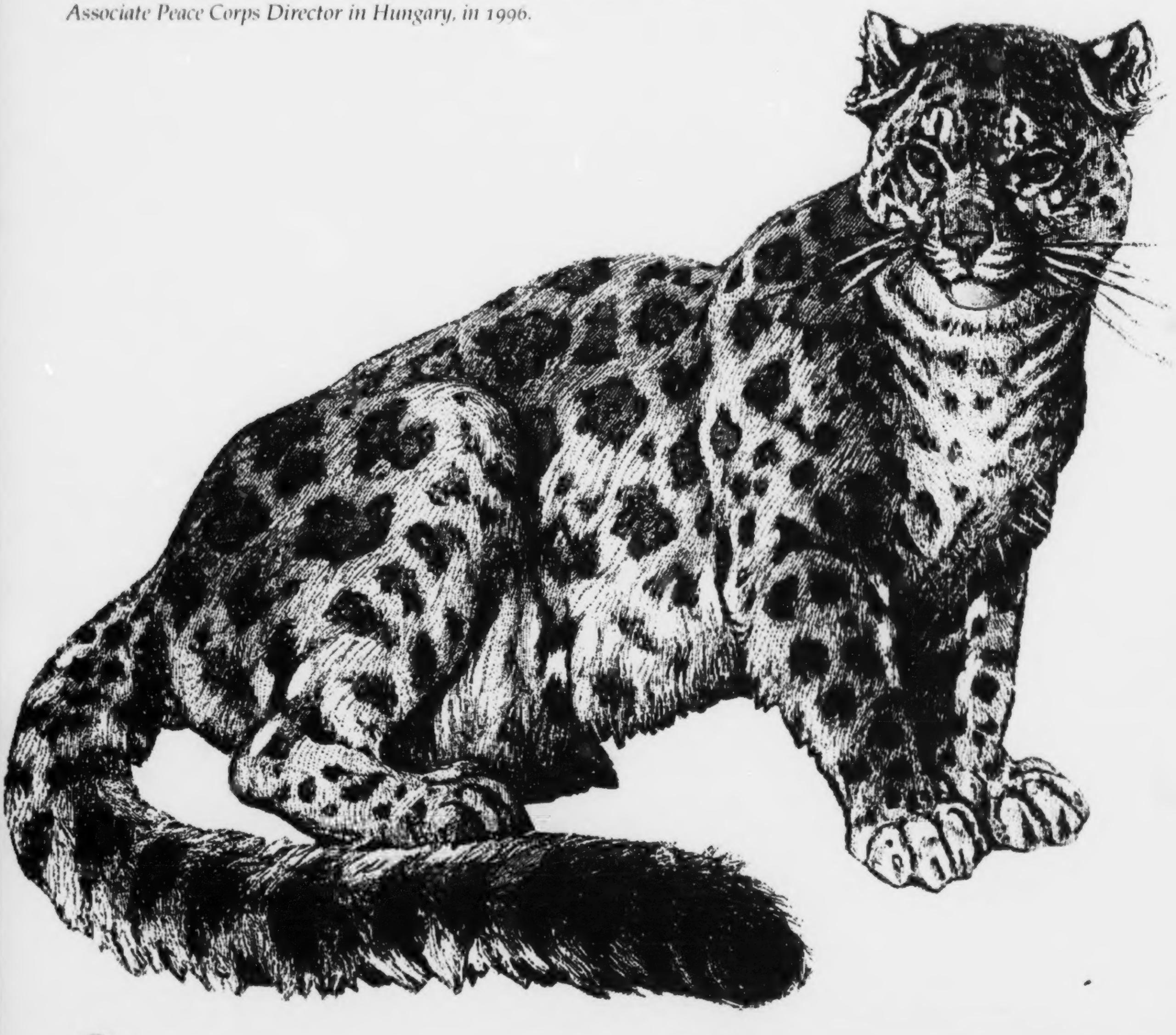
Peace Corps and two environmental NGOs cooperated to adapt the macro-invertebrate guide for Hungary. The adaptation team went through a thorough process to produce the adaptation, including the following:

- They identified environmental education program goals and objectives to address important environmental issues and target audiences.
- They identified what needed to be done to produce and distribute the Hungarian version of the key.
- They developed a draft adaptation to test it for strengths and weaknesses.
- They mobilized the available human, financial, technical, and information resources of the three organizations.
- They applied for and received a copyright waiver to produce 600 copies of the final version of the adapted guide, which would be distributed free of charge.

Most of the technical contributions were offered as in-kind support from individuals employed by or volunteering their time for one of the three organizations. For example, computer experts from one of the NGOs designed the layout and a taxonomist from the local university ensured that the scientific information was accurate and that important Hungarian macro-invertebrates were represented. As a result of this collaborative, participatory process, the final adaptation was a low-cost, high-quality product.

The adaptation of *A Key to Freshwater Macro-Invertebrates* also fostered the development of a variety of unexpected skills among participants in the adaptation process. Some of these include experiences in collaborative problem-solving; analysis and planning; enhanced technical skills in materials development, editing, and layout; enhanced understanding of macro-invertebrates and their roles as indicators of water quality; and experiences in fundraising and budgeting.

This case study was developed from communications with Andrea Deri, former Associate Peace Corps Director in Hungary, in 1996.



ADAPTATION
CASE STUDY
FOUR

BRINGING THE WORLD RESOURCES INSTITUTE TEACHING GUIDES TO MEXICO

THE CHALLENGE

Environmental educators in Mexico expressed a need for high-quality, objective curriculum materials that would address global environmental issues. The World Resources Institute teacher guides were identified as excellent materials because they deal with issues of sustainable development, biodiversity, natural resource economics, women and sustainable development, and other relevant topics. Unfortunately, the guides were developed primarily for an American audience, and do not fit the educational and cultural framework of Mexico. What steps will you take to make effective use of these environmental education materials in Mexico?

WHAT REALLY HAPPENED

WRI worked with Mexican partners to adapt and translate the teacher guides. A fundamentally sound and relevant environmental education guidebook was adapted to include local references and examples (including local flora, wildlife, and environmental issues) that reflect the tone, perspectives, art, and other elements of Mexican culture; and that fit the Mexican educational structure.

A fundamentally sound and relevant environmental education guidebook was adapted to include local references and examples (including local flora, wildlife, and environmental issues) that reflect the tone, perspectives, art, and other elements of Mexican culture; and that fit the Mexican educational structure.

The adaptation began with a literal translation of the original version, which was then circulated to 40 educators throughout Latin America, and who were asked to return a questionnaire about what should be done to make the manuscript useful in local schools. Those comments were then used to create the adapted guides. The authors worked with several partners to obtain lists of readings and audiovisual materials available in Mexico and hired a local artist to illustrate the guide. They also substituted local examples and case studies, where possible. The most striking difference in the Mexican adaptation was the reorganization of the materials into a narrative with teaching suggestions at the end. This was necessary, the Mexican adapters said, because Mexican teachers had less access to books on the topics and needed straightforward information before jumping into lesson strategies. WRI reviewed the manuscript and final drafts to ensure that the adaptation retained the accuracy of the original data. WRI also evaluated the adaptation process to ensure that the adaptation was widely reviewed by local educators and experts.

This case study was developed from communications with Mary Paden, Environmental Education Director with WRI, in Washington, DC, in 1996.

SESSION

ADAPTING A LESSON TO LOCAL REALITIES

OVERVIEW

Participants will adapt "The All New Water Review" for use in their educational setting.

PURPOSE

- To identify the issues to consider in adapting a lesson to one's own reality.
- To practice adapting a lesson, present the adaptation to workshop participants and discuss how the lesson could be used with students or groups of illiterate people.

TIME

2-3 hours, depending on the size of group.

MATERIALS

- A set of role cards for enacting one version of "The All New Water Review." (Note to facilitators: Choose the most relevant version from the three presented here). On the back of each card, write the heading (Person, Pipe, and so on, in letters large enough to be read across the room).
- "The All New Water Review" original and adapted versions displayed on newsprint or copies for each participant.
- Blank newsprint and markers.
- Paper and pens or pencils for participants.

FROM THE FORMS AND HANDOUTS SECTION OF THIS MANUAL

- Quick Review Form and Adaptation Issues Form, copies for each participant or one large copy on newsprint
- Adaptation Possibilities, written on newsprint or a blackboard.
- A Systematic Approach to Adapting Materials, written on newsprint or a blackboard.
- Principles of Successful Adaptation, written on newsprint or a blackboard.

STEPS

During the lesson, participants will learn how "The All New Water Review" has been adapted in the past and will then adapt it to their own situations.

Start the activity by doing "The All New Water Review" skit, with the facilitator serving as the teacher and the participants serving as the students. Pass out the cards to the students. Those with cards should stand in a circle while the others stand and watch. Explain that each card represents a component of the water cycle. Most cards will have two statements on the back. Card holders should read the first statement only once, when they first join the skit. Every other time, they will read the second statement. Start with "Person," and ask for the student with the Person card to read the first statement. Before going on to the next card, ask the students how the water gets to the Person's home. Then work through each step in the cycle, getting the students to identify the steps and the card holders to read the associated cards. Work through the entire skit twice, encouraging the readers to develop a rhythm by clapping along. Once everyone has had fun with the activity, talk about how the skit has been adapted from place to place to reflect local conditions.

Distribute copies of the original skit developed for urban settings, the rural adaptation, and the Botswana adaptation. If copies are not available, post the skit and the adaptations on newsprint or a blackboard where they can be read by participants. Compare the three different versions of the skit and discuss how it changed when it was adapted from one place to another. Relate these changes to the system of water distribution and treatment used in each setting. Discuss briefly which environmental issues the skit may help address. Discuss other linear or cyclical activities that could be described using a similar activity (how cloth is made, where electricity is generated, the seasons of the year, or others).

Ask participants to again read "The All New Water Review" background and the original version of the skit with their own students in mind, and make notes on the Quick Review Form.

Ask participants for their impressions of the activity, and what they determined by using the Quick Review Form. Is the lesson appropriate as is, considering age level and educational setting? Is there enough information for them to teach the lesson? Discuss and list on newsprint issues they have to consider to adapt the lesson to their own locale.

Review and discuss the Adaptation Possibilities list. Ask participants to add their own ideas for adaptation.

Divide participants into small groups (to a maximum of five participants per group). Group colleagues from the same organization or those who have similar teaching responsibilities (similar ages, similar subjects, formal versus informal educational setting, and so on.) Have groups work together to draft an adaptation of "The All New Water Review" to make it appropriate to their teaching environment. Distribute the Adaptation Issues Form and ask each group to use it to adapt "The All New Water Review." Tell groups that they will present the results of their adaptation to the large group when they have finished.

Give groups 30-45 minutes to work.

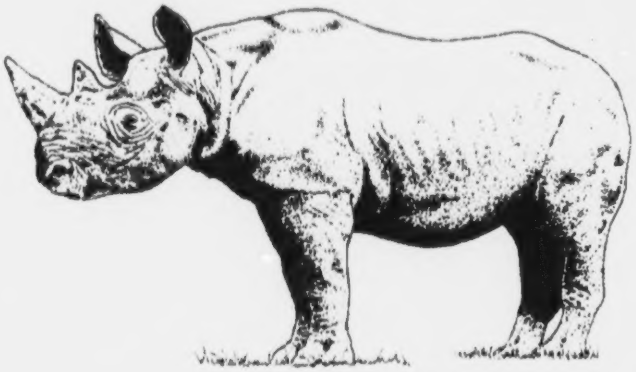
APPLICATION

Have each group present or discuss their adaptation of "The All New Water Review." Summarize the small-group work by discussing the experience of adapting the lesson. Questions for discussion might include the following:

1. What changes did you make to the activity? Why?
2. If you were going to use this lesson with your students, what other adaptations would you need to make?
3. If you wanted to use this lesson with an illiterate audience in your community, what adaptations wouid you need to make?
4. Would this lesson need to be adapted differently for use with men and women? If so, how would it differ?
5. Did you have the necessary information to adapt the lesson? What resources (e.g., institutions, people, materials) exist within your community, park, or school to help you find out more about the topic or to help with the adaptation process?
6. How might this activity be adapted for use in math, science, or English classes? How would you collaborate with teachers of different subjects to adapt the activity and use it in a classroom?
7. How would this activity fit within a larger environmental education plan or strategy at your school, park, or organization?

Review the list of adaptation issues that were determined earlier in the session. Are there any that need to be added?

In summary, review and discuss the display or handout of A Systematic Approach to Adapting Materials. Ask for ideas about the process and its relevance to the individual teaching settings of the participants. Present (or review if it was presented earlier) Principles of Successful Adaptation. Discuss and make additions or revisions based on participants' experiences.



THE ALL NEW WATER REVIEW

"The All New Water Review" was written by Martha Monroe. It is reprinted with permission from NSTA Publications, copyright 1990 from *Science & Children*, National Science Teachers Association, 1840 Wilson Boulevard, Arlington, VA 22201-3000, USA. It can also be found on pages 114-118 of *Environmental Education in the Schools-Creating a Program that Works!*

OBJECTIVE To learn about the water cycle and the role of people in it.

AGES Primary and intermediate school children.

SUBJECT Science

MATERIALS Role cards for each element in the water cycle.

BACKGROUND

"The All New Water Review" introduces learners to the water cycle and their role in it. Each person then plays a role proceeding backward through the cycle, from pipes to pump to treatment plant; to groundwater to rain to clouds and the sun. The cycle does not end, however, because it does not address what happens to water after it is used; so three more students enter the cycle, playing the roles of toilet, sewer pipes, and a wastewater treatment plant. As each person enters the cycle, the skit becomes a chant, with each person repeating his role in turn, thus reinforcing the cycle.

As people join the cycle, they stand up and join hands with the person representing the element that follows them in the cycle. A physical circle forms in the room.

To produce the skit, develop a sequence of statements to describe water treatment and collection systems in your area. This may become a discovery activity for students, for which they go into the community to see where their water comes from and where it goes after use. Once students understand water collection and treatment, develop a series of statements similar to the ones shown in the examples that follow. Place the statements on cards, with one card for each element (person, water pipe, groundwater, and so on). Most cards will have two statements: The first is read when a student enters the cycle, the second is read during each subsequent turn. The statements can be written on one side of a card with the name of the element (person, water pipe, and so on) written in big letters on the other side, so that everyone can see clearly which role is being played. Alternatively, make larger cards with the names of the elements on them and attach a string to the cards to hang around students' necks.

Once students understand the water cycle in their community, introduce deviations. For example, ask about the effects of chemicals poured down the drain or left to seep into the groundwater from the surface through agricultural practices. Introduce drought or flood as an element and ponder the effects of these on the cycle.

ORIGINAL VERSION—RURAL WISCONSIN

/ PERSON AT FAUCET / WATER PIPE / WELL / GROUNDWATER / RAIN / CLOUD / SUN /
TOILET / SEWER PIPE / SEPTIC TANK /

PERSON AT FAUCET

1. I am the person who turns on the faucet and gets a drink!
2. ... and turns on the faucet and gets a drink!

WATER PIPE

1. I am the pipe that carries water through the town into homes ...
2. ... where it's carried through the town into homes ...

WELL

1. I am the well that brings water from deep in the ground up to the house ...
2. ... where it is pumped from the ground into the house ...

GROUNDWATER

1. I am the groundwater that slowly moves through the soil until I am pulled up by a well ...
2. ... recharging the groundwater and moving slowly to the well ...

RAIN

1. I am the rain that falls to the ground ...
2. ... till it falls as rain ...

CLOUD

1. I am the cloud that holds water vapor in the sky ...
2. ... where it hangs in the clouds ...

SUN

1. ... I am the sun that evaporates the water ...

TOILET

1. Then ... the water is flushed down the toilet ...

SEWER PIPE

1. ... and is carried by sewer pipes ...

SEPTIC TANK

1. ... to the septic tank under the house where micro-organisms decompose many of the waste products and return the water to the ground ...

URBAN ADAPTATION

/ PERSON AT FAUCET / WATER PIPE / PUMPING STATION /
WATER TREATMENT PLANT / GROUNDWATER / RAIN / CLOUD / SUN /
TOILET / SEWER PIPE / WASTE WATER TREATMENT PLANT /

PERSON AT FAUCET

1. I am the person who turns on the faucet and gets a drink!
2. ... and turns on the faucet and gets a drink!

WATER PIPE

1. I am the pipe that carries water through the town into homes ...
2. ... where it's carried through the town into homes ...

PUMPING STATION

1. I am the pumping station that pumps water into pipes ...
2. ... that is pumped into pipes ...

WATER TREATMENT PLANT

1. I am the water treatment plan that purifies the water, adding chlorine to kill bacteria ...
2. ... that purifies the water ...

GROUNDWATER

1. I am the groundwater that slowly moves through the soil until I am pumped into a water treatment plant ...
2. ... recharging the groundwater and moving slowly to the water treatment plant ...

RAIN

1. I am the rain that falls to the ground ...
2. ... till it falls as rain ...

CLOUD

1. I am the cloud that holds water vapor in the sky
2. ... where it hangs in the cloud ...

SUN

1. ... I am the sun that evaporates the water ...

TOILET

1. Then ... the water is flushed down the toilet ...

SEWER PIPE

1. ... and is carried by sewer pipes ...

WASTEWATER TREATMENT PLANT

1. ... to the wastewater treatment plant where it is filtered, treated, and released to the marsh

BOTSWANA ADAPTATION

/ PERSON AT FAUCET / STAND PIPE / BOREHOLE / GROUNDWATER / RAIN /
CLOUD / SUN / OUTHOUSE /

PERSON AT FAUCET

1. I am the person who turns on the faucet and gets a drink!
2. ... and turns on the faucet and gets a drink!

STAND PIPE

1. I am the pipe that carries the water from the ground to the surface ...
2. ... where it's carried from the ground to the surface ...

BOREHOLE

1. I am the borehole that pumps water from deep in the ground up to the standpipes ...
2. ... that pumps water from the ground into the standpipes ...

GROUNDWATER

1. I am the groundwater that slowly moves through the soil until I am pulled up by a borehole ...
2. ... recharging the groundwater and moving slowly to the borehole ...

RAIN

1. I am the rain that falls to the ground ...
2. ... till it falls as rain ...

CLOUD

1. I am the cloud that holds water vapor in the sky
2. ... where it hangs in the cloud ...

SUN

1. ... I am the sun that evaporates the water ...

OUTHOUSE

1. Then ... the water is left in the outhouse to seep slowly into the ground ...

SESSION

SIMPLIFYING AND ADAPTING TEXT

OVERVIEW

Participants will work with an existing lesson, simplifying and adapting text for their students, and determining how they can create other language lessons from the same materials.

PURPOSE

- To adapt material to specific learners (grade, geographic location) by simplifying vocabulary, sentence structures, and grammar and using local and other examples within the students' frames of reference.
- To discuss the use of a central theme to teach several different language skills such as visualizing and writing from listening, vocabulary, grammar, reading, writing, and speaking.

TIME

2 hours

MATERIALS

- Enough copies of *Water Wings* for each pair group, or one copy written on a blackboard
- Blank newsprint and markers
- Paper and pencils or pens for participants' individual work

FROM THE FORMS AND HANDOUTS SECTION OF THIS MANUAL

- Guidelines for Simplifying Text written on newsprint

STEPS

A guided imagery exercise on the topic of water is used as a classroom lesson that teaches language skills. The lesson begins with participants working in pairs to adapt the lesson to make it appropriate for their local teaching reality according to their students' ages, knowledge, and skills, and the language skill development dictated by curriculum guidelines.

Lead the participants through the guided imagery exercise using the existing text (the text is at the end of this session). Ask the participants to sit or rest quietly and listen to the text, which the facilitator reads to them. It may be useful to describe guided imagery to prepare them for the experience, and to ask if anyone has participated in guided imagery exercises before, and if so, to briefly describe the setting and situation. More information on guided imagery can be found on page 209 of *Environmental Education in the Schools-Creating a Program that Works!*

Once the text has been read aloud, ask participants to work in pairs to describe to each other the images that they had in their minds during the narration, or to draw a picture that describes what they imagined and to share it with their partner. Conduct a brief discussion among the group about their experiences and images during the text reading.

Pose the following questions and discuss the responses:

- What is the value of doing this type of activity in a language class?
- What did you think of the guided imagery exercise? If you had difficulty with the visualization, what kinds of problems did you have?
- How will your students relate to the guided imagery?
- Are there similar types of experiences that students might have in their culture that could be related to guided imagery, such as story-telling, which could be used to help them participate in it more easily?
- How could you overcome learners' lack of experience with guided imagery or resistance to it?

Is water quality or quantity an issue in the communities of the participants? Ask participants to briefly describe water-related issues in their locations, and how a guided imagery exercise might be useful as an educational tool to help learners address water issues.

Introduce and discuss the following guidelines about simplifying and adapting written materials. Ask participants for other ideas that could be included in the guidelines and write them onto newsprint or a blackboard.

GUIDELINES FOR SIMPLIFYING TEXT

1. Vocabulary:
    - Simplify
    - Identify new word to be taught
2. Idiomatic expressions:
    - Eliminate them all together
    - Identify new ones to be taught
3. Sentence length:
    - Reduce
4. Paragraph length:
    - Reduce
5. Grammatical structures:
    - Simplify
    - Identify new ones to be taught
6. Information:
    - Eliminate unnecessary details
7. Abstract ideas:
    - Replace with concrete actions
8. Total length:
    - Shorten or lengthen, depending on the purpose of the lesson

Divide participants into pairs (e.g., colleagues, Volunteer and counterpart, two teachers who work with similar age groups) and distribute copies of the *Water Wings* text to each pair. Ask each pair to review the text together and adapt it to their own teaching situations. Allow about 30 minutes to complete this assignment.

Have one or two pairs read their adaptations of the guided imagery text.

Discuss their experience with doing an adaptation by posing the following questions:

- How did you simplify? (Ask for specific examples.)
- What adaptations did you make to local realities?
- What difficulties did you have with this task, if any?
- What resources might be available in your school or community to help you make a final adaptation of this lesson?

APPLICATION

Working in pairs again, ask participants to spend another 30 minutes applying this lesson or any parts of it to their English language classes. Ask pairs to consider specifically how they could use this lesson to teach...

... reading?
... vocabulary?
... grammar?
... listening/dictation?
... writing?
... speaking?

Also consider adapting the lesson to include:

- field trips
- studying a local issue or problem
- community education and action

The purpose of this task is not to do all of these things but, rather, to outline in detail how you can use the content in the session for specific lessons for English classes.

After the work period, take some examples of participants' applications. If they do not state it, ask how the lessons would fit within the required curriculum guidelines for their school.

Finally, ask participants how they could collaborate with colleagues from other subject areas to address water issues across the curriculum.

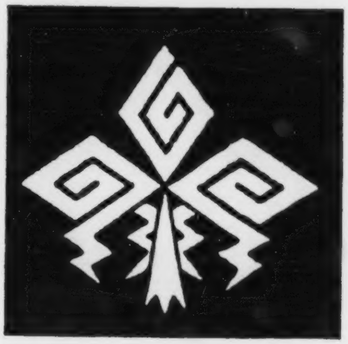
NOTE TO THE TRAINER

Try your own adaptation exercise by adapting the session to train people, other than English language teachers, who work in settings where English is not the first language. How would you adapt this session for park interpreters, classroom environmental educators, or others who might like to use the guided imagery session with people who do not speak English as their first language?

"Water Wings" Copyright 1987, 1992 by Council for Environmental Education. Reprinted with permission from Project WILD Aquatic Education Activity Guide. The complete activity guide can be obtained by attending a Project WILD workshop. For more information contact the Project WILD National Office in Maryland, USA at 301/493-5447. The address is Project WILD, 5430 Grosvenor Lane, Suite 230, Bethesda, Maryland 20814-2142 USA, or see the World Wide Web site at http://www.eelink.umich.edu/wild. "Water Wings" is also found on pages 216-219 of *Environment Education in the Schools-Creating a Program that Works!*

WATER WINGS

"You are to try to imagine the things you will hear me describing. Sit comfortably and close your eyes.... Relax, and do your best to imagine what I am describing.... You are sitting on the edge of a stream (lake, ocean, etc).... Your bare feet are swinging in clean, clear water.... The water feels good, but it is cool.... You feel a current washing over your feet, pulling at them.... Think about the water flowing past your feet until it reaches a larger stream.... The water connects you with the larger stream.... Feel its more powerful flow.... See the green ribbon of trees and plant life on the banks.... The larger stream carries the water past flat farmlands, cities, factories, and forests until it eventually reaches the sea.... Through your feet and the continuous currents of water you can imagine that you feel the sea.... Now stretch your mind and realize that you interconnect with all the world's oceans.... You are now touching one single body of water that stretches all around the world.... Your own body contains water that is part of this system.... Your touch laps against the shores of the Pacific Ocean, it flows under the Golden Gate Bridge in San Francisco Bay, it leaps and plunges around oil drilling platforms in the North Atlantic.... It pours from the sky as a storm rages dark and gray. It drenches an Alaskan native who shivers on the Arctic shores before her parka begins to warm her.... It glistens on the back of a Greek boy who tugs fiercely on fishing nets in the warm Mediterranean Sea.... Water connects your feet with every stream flowing into the oceans around the world.... You can reach up the rivers to the hearts of continents.... You can feel the tremor of the hippopotamus that just dove into an African river.... You can feel an alligator silently sliding toward a heron in the Florida Everglades.... You can feel beavers busily building a dam on a stream in Europe.... You can see water, thousands of tons of it, in great drifting fleets of heavy white cloud.... Your reach embraces all the whales, all the porpoises, all the sharks.... You are connected with the mythic creatures, living only in the minds of people in the past—mermaids, citizens of Atlantis, and the mythic monsters that swim in Loch Ness.... Your feet feel the flow of the current of the miles-wide Amazon River in South America, the ancient Nile River pushing north through Africa, the Colorado River thundering with a boatful of river rafters through the Grand Canyon.... Your watery embrace wraps all around the Earth.... And, of course, the water flowing over your feet connects you with everyone else who is now sitting, with feet dangling in a stream, wondering where the water goes.... It is time to come back.... Bring the limits of your senses back from the world's rivers and oceans.... back to the surfaces of your feet...back to where you are.... When you feel ready, you may open your eyes."



SESSION

ADAPTING LESSONS TO DIFFERENT ENVIRONMENTS AND CULTURES

OVERVIEW

Participants will study the adaptation of "Oh Deer!" for use in a rural culture where livestock overgrazing is an important environmental issue.

PURPOSE

- To demonstrate how an adaptation can retain the basic framework of an activity, but address a different environmental issue and local reality.
- To discuss how the lesson could be adapted differently to address issues of relevance to participants.

TIME

2-3 hours, depending on the size of group.

MATERIALS

- "Oh Deer!" original and adapted versions or copies for each participant, if possible.
- Blank newsprint and markers or blackboard and chalk.
- Large open area, preferably outside.

FROM THE FORMS AND HANDOUTS SECTION OF THIS MANUAL

- Adaptation Issues Form, copies for a small group or one large copy on newsprint
- Adaptation Possibilities written on newsprint or a blackboard.

- A Systematic Approach to Adapting Materials written on newsprint or a blackboard.

STEPS

During the lesson participants will explore how "Oh Deer!," an activity developed in the United States, was adapted to become "Oh Cow!" for use in the rural Sahel of West Africa.

Start the activity by conducting several rounds of the original "Oh Deer!" activity (a copy is included on the next few pages) during which the facilitator serves as the teacher and the participants are the students. Play enough rounds to collect enough data to demonstrate the rising and falling of the deer population and construct a graph that visually demonstrates the dynamics of the deer population. When the activity is over, talk about the objectives of the activity and how the objectives are met. Ask participants who they imagine the activity was developed for (American children in a school setting) and the environmental issues that it was designed to address (wildlife habitat conservation and wildlife protection).

The activity was developed by Project WILD, an environmental education program based in the United States. Project WILD's goal is the following: *Assist learners of any age in developing awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive action concerning wildlife and the environment upon which all life depends.*

The activity uses a wildlife population to demonstrate the ecological principles of habitat requirements and carrying capacity. Wildlife is a compelling topic in the United States, and many people believe that wild animals should be protected. People are familiar with wild animals because they have opportunities to see them in zoos, on television, or through mass media. Most people live in urban or suburban areas where they no longer have to fear wild animals. Habitat loss and degradation is a significant issue in the United States because of development and pollution. Wildlife habitat can also be linked to human habitat and decisions affecting wildlife also affect human life because, generally, humans and wildlife share the same home. For these reasons, an environmental education activity based on wildlife is appropriate for the United States. The activity could also be used in many other countries without a great deal of modification.

Explain that when "Oh Deer!" was taken to the Sahel, the activity was not relevant to students living there because wildlife are not widely appreciated by the rural population; on the contrary, wildlife are often seen as dangerous and competing with humans for resources and food. While wildlife conservation may be important, building appreciation and awareness is a long-term process. Of immediate interest are quality-of-life issues associated with land degradation. Much of the land degradation is associated with poor farming practices and overgrazing by domestic livestock. These are the critical issues that need to be addressed in the short term and that relate to the everyday lives of rural people. If land degradation can be slowed or stopped, this will in turn have positive benefits for people and wildlife. "Oh Deer!" was adapted to become "Oh Cow!" for use in the Sahel to address land degradation by livestock overgrazing.

Play "Oh Cow!" with participants (the activity is included in the next few pages). Play enough rounds to demonstrate population or herd dynamics. Rather than always letting the habitat role players self-select their roles, the facilitator should take a more directive position. For example, taking away water and food elements can simulate environmental factors such as drought so that the effects on the population of livestock can be observed. Because "Oh Cow!" simulates a population of domestic animals, herd size is also affected by buying and selling of animals. When the population of animals is high, habitat conditions are good and an owner may be able to purchase more animals. To simulate this, convert some of the habitat players into animals at a high point in the population to represent livestock purchase by the owner. Observe what happens to the habitat when the population increases. How does the population size of the livestock herd change as the habitat is degraded?

At the end of the game ask participants to discuss the differences between the two activities using the Adaptation Issues Form flip chart to guide the discussion (see the Forms and Handouts section of this manual). What were the main adaptation issues that needed to be addressed? How was the activity adapted to address them?

APPLICATION

Briefly review the Adaptation Possibilities handout or display (see the Forms and Handouts section of this manual), pointing out solutions that the "Oh Cow!" adaptation used. Solicit ideas about additions to both adaptation issues and solutions and write these down on a blackboard or newsprint.

Divide participants into small groups. Group together colleagues from the same organization or those who have similar teaching responsibilities (age of students, similar subjects, formal versus informal educational setting, and so on). Ask groups to think about how "Oh Deer!" could be adapted to their own teaching environment. Distribute the Adaptation Issues Form and ask each group to complete it for "Oh Deer!" and to make recommendations for how the activity could be adapted. Ask groups to present the results of their discussion to the large group when they have finished.

Give groups 30-45 minutes to work.

Have each group discuss their suggestions for adapting "Oh Deer!" Summarize the small group work by discussing the experience of adapting the lesson. Questions for discussion might include the following:

- In general, what changes did you make to the activity? Why?
- Could you adapt this activity to use it with adults? If so, how would it be changed?
- Would this lesson need to be adapted differently for use with girls or boys, or with a mixed group of boys and girls? If so, how would it differ?
- Do you have the necessary information to adapt the lesson? What resources (institutions, people, materials) exist within your community, park, or school to help you find out more about the topic or to help with the adaptation process?
- How can this activity be adapted for use in math, science, or English classes? How would you collaborate with teachers of different subjects to adapt the activity for use in a classroom?
- How would this activity fit within a larger environmental education plan or strategy at your school, park, or organization? An issue that might arise is that of providing solutions to environmental problems in the activity. The activity as adapted is thought-provoking, but it doesn't prescribe solutions. It is probably more powerful by not providing solutions, but asking questions that let children think for themselves about actions and consequences. However, in an overall educational strategy, additional activities should also be conducted that address livestock management techniques and soil conservation. For example, a watering area could be fenced and protected as a means of demonstrating how vegetation can grow back if it is protected. The protection should have positive benefits to water quality and quantity by protecting the soil and vegetation.

Review the list of adaptation issues determined earlier in the session. Are there any that need to be added?

126

OH DEER!

Objectives

Students will be able to: 1) identify and describe food, water, and shelter as three essential components of habitat; 2) describe the importance of good habitat for animals; 3) define "limiting factors" and give examples; and 4) recognize that some fluctuations in wildlife populations are natural as ecological systems undergo a constant change.

Method

Students become "deer" and components of habitat in a highly-involving physical activity.

Background

A variety of factors affects the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impacts of weather conditions from season to season (e.g., early freezing, heavy snows, flooding, drought), accidents, environmental pollution, and habitat destruction and degradation are among these factors.

Some naturally-caused as well as culturally-induced limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and eliminating whole species of animals.

The most fundamental of life's necessities for any animal are food, water, shelter, and space in a suitable arrangement. Without these essential components, animal cannot survive.

This activity is designed for students to learn that:

a) good habitat is the key to wildlife survival;
b) a population will continue to increase in size until some limiting factors are imposed;
c) limiting factors contribute to fluctuations in wildlife populations; and
d) nature is never in "balance," but is constantly changing.

Wildlife populations are not static. They continuously fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to a single species, although one factor may affect many species. Natural limiting factors, or those modeled after factors in natural systems, tend to maintain populations of species at levels within predictable ranges. This kind of "balance in nature" is not static, but is more like a teeter-totter than a balance. Some species fluctuate or cycle annually. Quail, for example, may start with a population of 100 pairs in early spring; grow to a population of 1200 birds by late spring; and decline slowly to a winter population of 100 pairs again. This cycle appears to be almost totally controlled by the habitat components of food, water, shelter, and space, which are also limiting factors. Habitat components are the most fundamental and thereby the most critical of limiting factors in most natural settings.

This activity is intended to be a simple but powerful way for students to grasp some basic concepts: that everything in natural systems is interrelated; that populations of organisms are continuously affected by elements of their environment; and that populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in a process of maintaining dynamic equilibria in natural systems. The major purpose of this activity is for students to understand the importance of suitable habitat as well as factors that may affect wildlife populations in constantly changing ecosystems.

Materials

area—either indoors or outdoors—large enough for students to run; e.g., playing field; chalkboard or flip chart; writing materials

Age: Grades 4–12

Subjects: Science, Math, Social Studies, Physical Education

Skills: application, comparing similarities and differences, description, discussion, generalization, graphing, kinesthetic concept development, observation, psychomotor development

Duration: 30–45 minutes

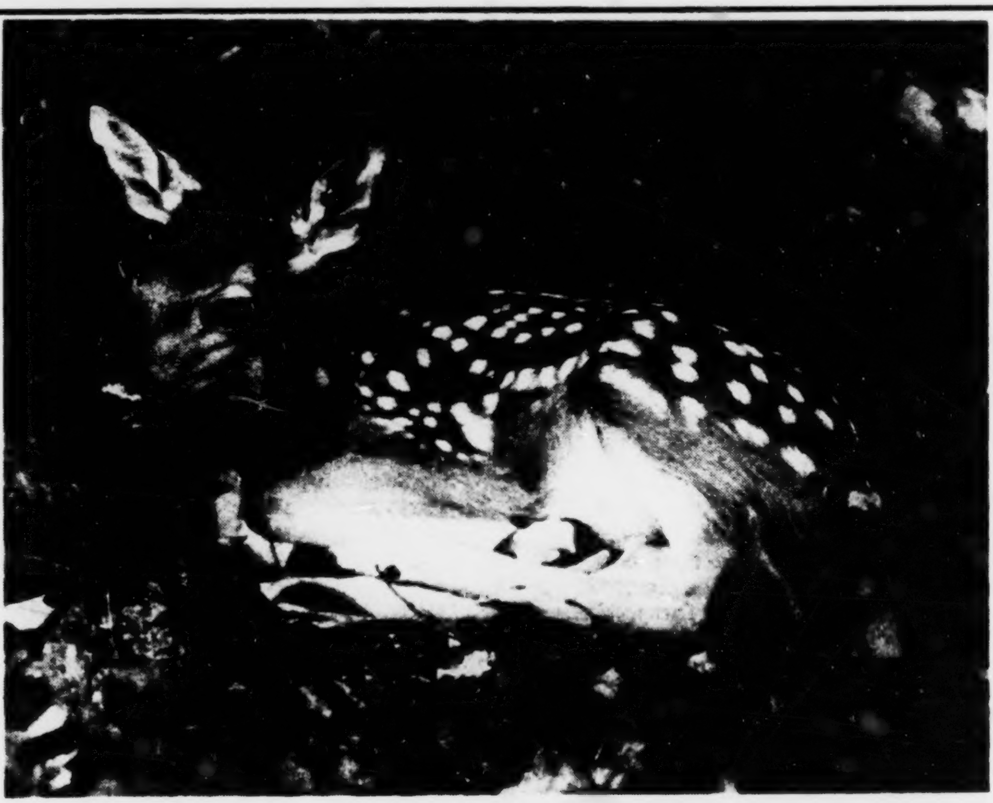
Group size: 15 and larger recommended

Setting: indoors or outdoors; large area for running needed

Key Vocabulary: habitat, limiting factors, predator, prey, population, balance of nature, ecosystem

© 1983, 1985, 1992 Council for Environmental Education. Reprinted with permission from *Project WID K-12 Activity Guide*. The complete activity guide can be obtained by attending a Project WID workshop. For more informaiton, contact the Project WID National Office at (301) 527-8900.

BEST COPY AVAILABLE



Procedure

1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components of habitat with the students: food, water, shelter, and space in a suitable arrangement. This activity emphasizes three of those habitat components—food, water, and shelter—but the students should not forget the importance of the animals having sufficient space in which to live, and that all the components have to be in a suitable arrangement or the animals will die.

2. Ask your students to count off in four's. Have all the one's go to one area; all two's, three's, and four's go together to another area. Mark two parallel lines on the ground or floor ten to 20 yards apart. Have the one's line up behind one line; the rest of the students line up behind the other line.

3. The one's become "deer." All deer need good habitat in order to survive. Ask the students what the essential components of habitat are again: **food, water, shelter,** and **space in a suitable arrangement.** For the purposes of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water, and shelter. The deer (the one's) need to find food, water, and shelter in order to survive. When a deer is looking for **food,** it should clamp its hands over its stomach. When it is looking for **water,** it puts its hands over its mouth. When it is looking for **shelter,** it holds its hands together over its head. A deer can choose to look for any one of its needs during each round or segment of the activity; **the deer cannot, however, change what it is looking for;** e.g., when it sees what is available, **during that round. It can change again what it is looking for in the next round, if it survives.**

4. The two's, three's, and four's are food, water, and shelter—components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the deer show what they are looking for; that is, hands on stomach for food, etc.

5. The game starts with all players lined up on their respective lines (deer on one side; habitat components on the other side)—and **with their backs to the students at the other line.**

6. The facilitator or teacher begins the first round by asking all of the students to make their signs—each deer deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to get their hands in place—over stomachs, mouths, or over their heads. (As you look at the two lines of students, you will normally see a lot of variety—with some students water, some food, some shelter. As the game proceeds, sometimes the students confer with each other and all make the same sign. That's okay, although don't encourage it. For example, all the students in habitat might decide to be shelter. That could represent a drought year with no available food or water.)

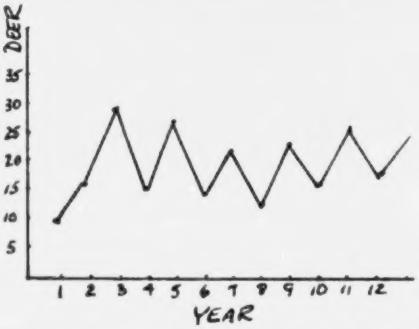
7. When you can see that the students are ready, count: "One . . . two . . . three." At the count of three, each deer and each habitat component turn to face the opposite group, continuing to hold their signs clearly.

8. When deer see the habitat component they need, they are to run to it. Each deer must hold the sign of what it is looking for until getting to the habitat component person with the same sign. Each deer that reaches its necessary habitat component takes the "food," "water," or "shelter" back to the deer side of the line. This is to represent the deer's successfully meeting its needs, and successfully reproducing as a result. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat. That is, in the next round, the deer that died is a habitat component and so is available as food, water, or shelter to the deer who are still alive. NOTE: When more than one deer reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a deer needs them. If no deer needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. The habitat person can, however, change which component it is from round to round.

9. You as the facilitator or teacher keep track of how many deer there are at the beginning of the game, and at the end of each round you record the number of deer also. Continue the game for approximately 15 rounds. Keep the pace brisk, and the students will thoroughly enjoy it.

10. At the end of the 15 rounds, gather the students together to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small herd of deer (seven students in a class size of 28) begin by finding more than enough of its habitat needs. The population of deer expanded over two to three rounds of the game, until the habitat was depleted and there was not sufficient food, water, and shelter for all the members of the herd. At that point, deer starved or died of thirst or lack of shelter, and they returned as part of the habitat. Such things happen in nature also.

11. Using a flip chart pad or an available chalkboard, post the data recorded during the game. The number of deer at the beginning of the game and at the end of each round represent the number of deer in a series of years. That is, the beginning of the game is year one; each round is an additional year. Deer can be posted by five's for convenience. For example:



The students will see this visual reminder of what they experienced during the game: the deer population fluctuated over a period of years. This is a natural process, as long as the factors which limit the population do not become excessive, to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak, decline, and rebuild, peak, decline, and rebuild—as long as there is good habitat and sufficient numbers of animals to successfully reproduce.

12. In discussion, ask the students to summarize some of the things they have learned from this activity. What do animals need to survive? What are some of the "limiting factors" that affect their survival? Are wildlife populations static, or do they tend to fluctuate, as part of an overall "balance of nature?" Is nature ever really in "balance," or are ecological systems involved in a process of constant change?

BEST COPY AVAILABLE

OH COW!

Adaptation of "Oh Deer" for use in the Sahel of West Africa.

OBJECTIVES

Participants will be able to 1) identify and describe food, water, and shelter as three essential things that livestock and other animals, including humans, need to survive; 2) describe what happens if livestock and other animals do not have enough food, water, or shelter; 3) describe some factors that would limit the growth of livestock numbers; 4) describe how increases in livestock numbers through purchase influence habitat quality.

METHOD Participants act as cows, food, water, and shelter in a highly involved physical activity.

MATERIALS An indoor or outdoor area large enough for students to run; blackboard and chalk, or newsprint and markers

GROUP SIZE 15 or larger recommended

DURATION 30-45 minutes

PROCEDURE

1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components which are food, water and shelter with students.

2. Ask students to count off in fours. Have all the number ones go to one area; all twos, threes, and fours go together to another area. Mark two parallel lines on the ground or floor, 10 to 20 yards apart. Have the ones line up behind one line; the rest of the students line up behind the other line.

3. The number ones are "cows." Ask the students what their essential habitat components are: Cows need to find food, water, and shelter in order to survive. When a cow is looking for food, it should put its hands over its stomach. When it is looking for water, it should put its hands over its mouth. When it is looking for shelter, it should hold its hands together over its head. A cow can look for any one of its needs during any round of the activity; however, the cow cannot change what it is looking for during that round. In other words, the cow cannot decide to look for food, then see that there is no food available and change its search to water. For each round the cow must stay with its choice. The cow can change its choice during the next round if it survives.

4. The twos, threes, and fours are food, water, and shelter—the components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during the round. The students who choose to be food put their hands over their stomach, those who choose to be water put their hands over their mouth, and those who choose to be shelter put their hands together over their heads.

5. The game starts when all the cows are lined up on one side and all the habitat elements are lined up on the other. The players show their backs to the students on the other line.

6. The facilitator begins the first round by asking all students to make their signs—each cow decides what it is looking for, each habitat component decides what it is going to be. Give the students a few moments to decide what they will be and to get their hands in place to indicate their signs.

7. When the students are ready, count: "one, two, three." On three, each line turns to face the other, keeping their hand signs in place.

8. When the cows see the habitat sign that they need, they are to run to it. Each cow must hold the sign for what it is looking for until it reaches a habitat person with that sign. Each cow that reaches its necessary habitat takes that habitat-person back to the cow side of the line. This represents the cow living through the year and successfully reproducing as a result. Any cow that fails to find its food, water, or shelter dies and becomes part of the habitat; that is, in the next round, the cow that died is a habitat component and is available as food, water, or shelter to the other surviving cows.

9. Explain that because cattle are different than wildlife populations, human factors contribute to the size of a herd. For instance, during years when habitat conditions are good and the herd is healthy, a farmer may be able to afford to buy more cattle to increase the size of his herd. Simulate this event by waiting until the herd size is large, then announce that the farmer has purchased more cattle, and move some of the habitat students to the cattle side before the round begins. Be sure to note in your records the increased herd size and its cause.

10. To simulate events that are important to livestock populations in the Sahel, the facilitator works with the habitat students to simulate drought conditions at least once in the game. Without the cows hearing, instruct the habitat students to be only shelter, with no water or food during one round to simulate the loss of food and water during drought. Be sure to note the round or year of the drought so that you can refer to it later when you graph the population growth.

11. The facilitator keeps track of how many cows there are at the beginning of the game and at the end of each round. Continue the game for approximately 15 rounds. Keep the pace brisk.

12. At the end of 15 rounds gather the students together and discuss the activity. Ask them to describe what happened to the herd size over time and why.

13. Using a blackboard, graph the data that you recorded during the game. Record herd size on one axis and year on the other. The number of cows at the beginning of the game and at the end of each round represents the herd size in each year. The beginning of the game is year one, round two is year two, and so on. Be sure to indicate drought years and livestock purchases. The resulting graph is a visual reminder of the fluctuations of herd size and the relationship between herd size and land degradation. As the herd size increases, the habitat quality goes down. In other words, there is not enough food, water, and shelter to meet the needs of all cows. Some cows will die of starvation, thirst, or exposure to elements, which results in a decline in herd size.

14. In summary, review the vocabulary introduced during this activity. See next page.

VOCABULARY

DESERTIFICATION

A process by which an area becomes a desert due to changes in climate or actions of humans.

HABITAT

The type of environment in which an animal lives. Habitat includes the arrangement of food, water, shelter, and space suitable for an animal's needs. It is the life range that includes winter cover, cover to escape from predators, shade, and cover to give birth and rear young.

LIMITING FACTORS

Influences in the life history of any animal, population of animals, or species (e.g., food, water, shelter, disease, climate, and others). When one or more of these exceeds the limits of tolerance of an animal or population of animals, it becomes a limiting factor. It then directly affects the well-being of an animal and may result in death. Limiting factors can be caused by natural or human events.

OVERGRAZING

Grazing land so much that it can no longer provide food for livestock and, thus, loses its productive capability.

POPULATION OR HERD SIZE

The number of a particular species in a given area or number of cows in a group.

Point out to participants that a real drought occurred in the Sahel from 1968 to 1973. It came after seven years of rain had encouraged farmers to increase their livestock herds. During the drought five million cattle died and the degradation of the land that occurred as a result of the large herds in the early years of the drought led to long-term loss of soil productivity. Some call this condition desertification.

Ask participants what actions a farmer can take to keep his herd size high despite habitat degradation. For instance, a farmer could move his herd to other pastures, cut branches off trees, purchase supplemental feeds, or drill wells to pump water from deep in the earth. If the branches of trees are cut to provide food, how does that effect the ability of the tree to provide shelter to the cattle? Some scientists believe that killing of trees during drought leads to soil erosion and that other practices such as drilling wells for water encourages large herd sizes and ultimately leads to land degradation.

Ask participants if they have any ideas about how herd sizes can be kept more in harmony with the ability of the land to support the herd. Some ideas might include:

- Reestablishing traditional migratory grazing practices that allow vegetation to regrow.
- Limiting the number of livestock.
- Protecting water sources from trampling.

EXTENSIONS

Depict soil erosion by constructing a simple erosion demonstration. Find a small slope, or build one by piling up dirt. On one part make a smooth, bare slope of the dirt; on another part make contours with your fingers or miniature rock lines. In another part, put vegetation, either scattered over the dirt, or stuck into the dirt to simulate trees. Make a watering can by taking a discarded can and punching small holes in the bottom. Fill it with water, and let the water run down over the different "fields" that are either bare, contoured, or vegetated. Let your students observe erosion in process. As with any demonstration, you should practice this on your own before taking it in front of your students to make sure that you know what will happen. If constructed properly, you will see a distinct difference between the smooth slope and the slopes that are contoured or protected by vegetation.

Demonstrate soil compaction by cutting the ends off two equal size cans. Place one can a half-inch down in the soil in the schoolyard where the ground is heavily used; for example, on a path or a playing field. Place the other can a half-inch down in the soil in an area that has a lot of vegetation. Pour an equal amount of water in each can and measure how much time it takes for the water to be completely absorbed. Rain falling on compacted soils will run off and cause soil erosion.

Conduct a community project by fencing off a watering area after receiving permission from the proper authorities. Water can still be collected from the area, but no livestock should be allowed to enter. Observe the changes that take place in the vegetation of the protected area. To make the observations more precise, transect a line on the ground through the fenced area and at regular intervals, and record what students see along the line. Measurements can be as simple as noting whether each interval contains bare soil or a live plant. The transect can be measured again after the area has been protected for some period of time to measure the changes in vegetation cover.

For further information, see pages 246-252 of *Environmental Education in the Schools—Creating a Program that Works!*, the *Outreach Guides* on the topic of gardening, and *Teaching Conservation in Developing Nations.*

FORMS AND HANDOUTS

KEY STEPS IN PLANNING AN ENVIRONMENTAL EDUCATION PROGRAM

1. Identify the people that need to be involved.
2. Identify a community's important environmental issues.
3. Identify potential solutions to the environmental problems and the role of education in solving them.
4. Identify, screen, and select useful environmental education materials.
5. Adapt the materials and test them.
6. Implement the environmental education program.
7. Evaluate the program and the effectiveness of the adapted materials.

QUICK REVIEW FORM

Title of material	Focuses on desired environmental issue? (Y/N)	Appropriate for the selected audience? (Y/N)	Appropriate for the educational setting	Understandable able and easy to follow? (Y/N)	Evaluate further? (Y/N)

EVALUATING AN EE DOCUMENT FOR EXCELLENCE

Rate as: "1" Does not meet criterion
"2" Partially meets criterion
"3" Meets criterion
"NA" Not applicable

Title: ______________________________

Name of Reviewer: ______________________________

Key Characteristic	Criteria	Rating	Comments and Adaptation Issues
Is it fair and accurate?	Is it factually accurate?		
	Does it present balanced points of view?		
	Does it promote open inquiry?		
	Does it reflect a diversity of perspectives?		
Does it foster awareness and understanding of the environment?	Does it acknowledge feelings, experiences, and attitudes as factors in environmental issues?		
	Does it focus on concepts rather than facts?		
	Does it provide an economic and social context for environmental issues?		
	Does it explore environmental issues from different scales, including long-term and short term, and local to global?		
Does it emphasize skill building to enable learners to prevent and address environmental issues?	Does it promote the development of critical and creative thinking skills?		
	Does it explain how to apply these skills to issues?		
	Does it foster skills in how to take action?		

BEST COPY AVAILABLE

Key Characteristic	Criteria	Rating	Comments and Adaptation Issues
Does it promote environmental problem solving and action?	Does it promote personal responsibility?		
	Does it help learners see ways they can influence the outcome of the situation?		
Does it rely on sound instructional techniques that create an effective learning environment?	Is it based on a learner's interest and ability to construct knowledge through research, discussion, application, and practical experience?		
	Does it present a variety of instructional methods to address different learning styles?		
	Is it relevant to a learner's everyday life?		
	Does it encourage learning to take place beyond the boundaries of a classroom or educational center?		
	Is it interdisciplinary?		
	Does it present clear learning goals, objectives, and measurements of success?		
Is it well designed and easy to use?	Is the overall structure of the material logical and clear?		
	Is the overall format and layout clear?		
	Is it accompanied by institutional support and instruction in its use?		
	Is it adaptable to a variety of learning situations?		
	Does it fit within curriculum requirements and/or environmental education program goals?		

Do you recommend that this material be retained for possible adaptation?

BEST COPY AVAILABLE

A SYSTEMATIC APPROACH TO ADAPTATION

STEP 1

Identify your adaptation partners and apply the team approach to adaptation.

STEP 2

Identify adaptation issues that need to be addressed.

STEP 3

Identify the specific steps that need to be taken and who will be responsible for taking them, deadlines for completion, and sources for additional resources.

STEP 4

Complete a draft version of the adaptation, share it, use it, and test it.

ADAPTATION POSSIBILITIES

If...	Consider...
1. Examples are not appropriate to your locale	a. Substituting local species of plants and animals. b. Including local environmental issues, controversies, and people. c. Including artwork or photographs from your country or region.
2. The reading level is too difficult	a. Shortening sentences, simplifying grammar, and substituting simpler words. b. Introducing new words and telling students what to read for prior to their reading. c. Eliminating idiomatic language and scientific jargon.
3. Activities are too passive	a. Dividing material into parts and assigning small groups to make presentations. b. Introducing material with questions to be answered through reading or listening. c. Turning the material into a discovery or problem-solving lesson.
4. Activities don't fit the classroom subject	a. Converting environmental data into math problems. b. Assigning students measurement and data collection tasks and analyzing data in class. c. Using environmental topics to teach processes. d. Analyzing the curriculum to find connections to the topic area. e. Adding reading or writing exercises as prework or postwork to environmental education demonstrations or activities.
5. Material is biased	a. Having learners listen to, read, or discuss materials from different perspectives (e.g., community women, extension agents, farmers, children). b. Having learners research and write about the same problem from different perspectives.
6. Methodologies are not usable in your situation	a. Presenting the same material in a different way. b. Substituting simpler, locally available materials. c. Using one written copy rather than handouts by: • Reading aloud • Dictating main points • Outlining main points on a blackboard for students to copy • Having students work in groups to share limited copies.
7. Learners are illiterate	a. Transforming written ideas into simple pictures. b. Adding visual aids and demonstrations to the material. c. Modifying the material for use on radio or other mass media, if these are important channels of information in your community. d. Converting material into stories, songs, puppet shows, and other forms of popular entertainment to convey environmental messages.
8. A model does not fit your reality	a. Analyzing the differences to see if a model is transferable. b. Changing the focus from theory and information to demonstration and application for people living at a subsistence level by including information about health, literacy, agriculture, and forestry. c. Supplementing activities with written background information on the topic area, if reference books and information are limited. d. Finding ways to do without electricity, running water, and copying facilities, if they are not available.

ADAPTATION ISSUES FORM

Name of Activity or Lesson: ____________________

Name of Reviewer: ____________________

Adaptation Issue	Adaptation Action Needed
Examples are not appropriate	
Reading level is too difficult	
Activity is too passive	
Activity does not fit classroom subject	
Material is biased	
Methodologies cannot be used in your situation	
Learners are illiterate	
Model does not fit your reality	
Other	
Other	

GUIDELINES FOR SIMPLIFYING TEXT

1. Vocabulary:
   - Simplify
   - Identify new word to be taught

2. Idiomatic expressions:
   - Eliminate them all together
   - Identify new ones to be taught

3. Sentence length:
   - Reduce

4. Paragraph length:
   - Reduce

5. Grammatical structures:
   - Simplify
   - Identify new ones to be taught

6. Information:
   - Eliminate unnecessary details

7. Abstract ideas:
   - Replace with concrete actions

8. Total length:
   - Shorten or lengthen, depending on the purpose of the lesson

ACTION PLANNING FORM

Action Needed	Responsible Person	Deadline for Completion	Resource Needs and Sources

PLANNING CALENDAR

(Adapted from *Small Projects Design and Management: Training Manual for Volunteers and Counterparts*, Peace Corps ICE T0050.)

OBJECTIVES AND TASKS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	RESOURCES

PRINCIPLES OF SUCCESSFUL ADAPTATION

1. Build your adaptation on the foundation of an environmental education plan with clear objectives for what you hope to accomplish.
2. Collaborate in developing and implementing the education program and in adapting materials:
   - Build partnerships with people and organizations who can support your efforts.
   - Build on the knowledge of others.
   - Find the experts—make a list of possible sources and contacts, and follow-up with meetings.
   - Promote interdisciplinary links among technical sectors and between educators and scientists.
3. Identify, screen, and select the best environmental education documents to adapt. Look widely for resources, screen them to find those that will most likely meet your needs, and then select those to work on further.
4. Conduct an in-depth evaluation of the selected materials to find those that are of the highest quality and will best meet the needs of your program. Adaptation takes time and energy, and you want to invest effort on only the best materials that are available.
5. Give credit where credit is due by recognizing the original authors and obtaining clearance to use copyrighted materials.
6. Approach adaptation systematically, once materials have been selected. Follow these steps:
   - Identify adaptation partners.
   - Identify adaptation issues.
   - Identify what specific steps are needed to carry out the adaptation and who will be responsible for each.
   - Complete a draft version of the adaptation and test it.
7. Build in an evaluation and "try and try again":
   - Incorporate a review of the adaptation in draft form.
   - Test materials before finalizing them.
   - Do not make a large financial investment until materials have been tested.
8. Recognize that adaptation is a question of scale but that the same concepts of adaptation apply, whether a single lesson or a complete book of materials is being adapted.
9. Be aware that unadapted materials in the wrong setting can be demoralizing and unproductive. Your efforts to adapt good materials to your community are worth your effort.

ENVIRONMENTAL EDUCATION MATERIALS: GUIDELINES FOR EXCELLENCE

Modified from *Environmental Education Materials: Guidelines for Excellence.*
Reprinted with permission from the North American Association
for Environmental Education, 1996.

KEY CHARACTERISTIC 1, FAIRNESS AND ACCURACY:

Environmental education materials should be fair and accurate in describing environmental conditions, problems, and issues, and should reflect a diversity of perspectives on these factors. Fair and accurate materials:

- Are factually accurate,
- Are balanced with differing viewpoints and theories
- Promote an openness to inquiry, and
- Reflect diversity.

KEY CHARACTERISTIC 2, DEPTH:

Environmental education materials should foster an understanding and appreciation of environmental concepts, conditions, and issues, as appropriate for different developmental levels. Materials with depth:

- Focus on concepts,
- Present content in context, and
- Pay attention to different scales.

KEY CHARACTERISTIC 3, EMPHASIS ON BUILDING SKILLS:

Environmental education materials should build lifelong skills that enable learners to address and prevent environmental issues. Materials that emphasize skill-building promote:

- Critical and creative thinking,
- Application of skills to issues, and
- Action skills.

KEY CHARACTERISTIC 4, ACTION ORIENTATION:

Environmental education materials should promote civic responsibility by encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for action. Materials with an action orientation promote:

- A sense of personal stake and responsibility, and
- Self-efficacy.

KEY CHARACTERISTIC 5, INSTRUCTIONAL SOUNDNESS:

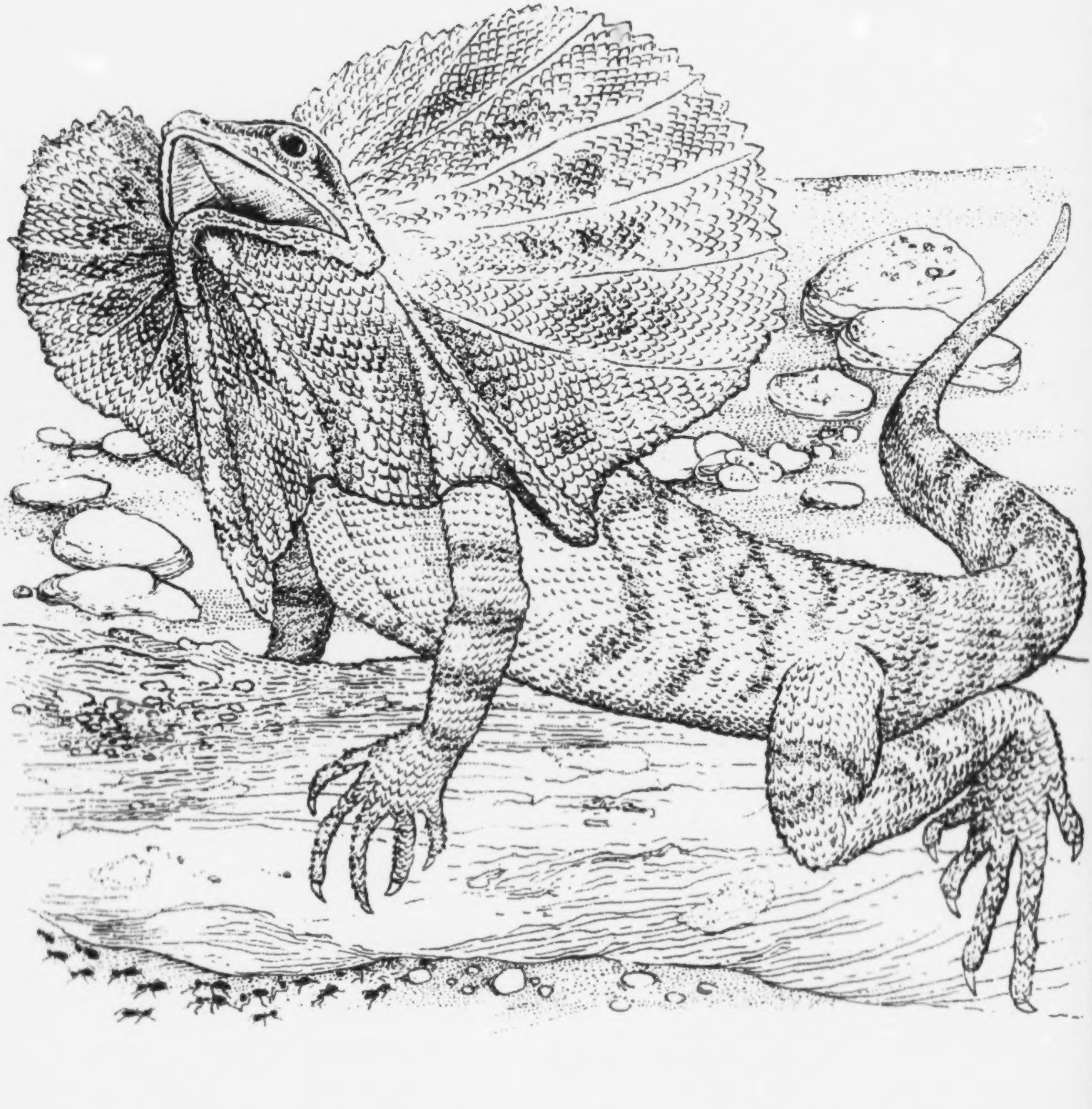
Environmental education materials should rely on instructional techniques that create an effective learning environment. Instructionally sound materials:

- Use learner-centered instruction,
- Recognize different ways of learning,
- Connect to learners' everyday lives,
- Expand the learning environment,
- Are interdisciplinary,
- State goals and objectives,
- Are appropriate for specific learning settings, and
- Include assessment.

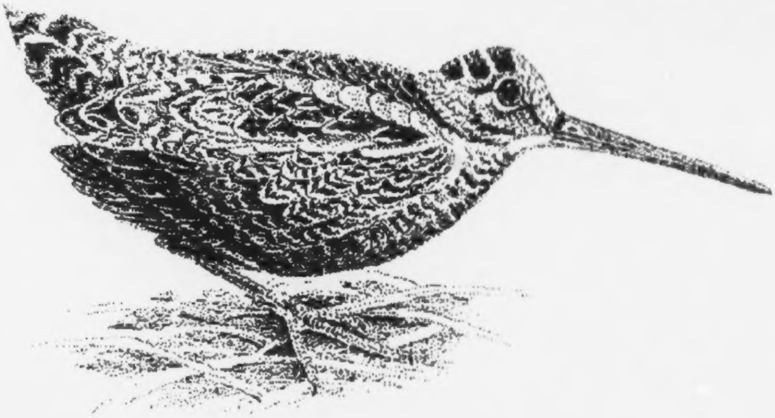
KEY CHARACTERISTIC 6, USABILITY:

Environmental education materials should be well designed and easy to use. Useable materials are:

- Are clear and logical,
- Are easy to use,
- Are long lived,
- Are adaptable,
- Are accompanied by instruction and support,
- Make substantiated claims, and
- Fit with state or local requirements.



OTHER RESOURCES AND READINGS



ENVIRONMENTAL EDUCATION MATERIALS: GUIDELINES FOR EXCELLENCE

Modified from *Environmental Education Materials: Guidelines for Excellence.* Reprinted with permission from the North American Association for Environmental Education, 1996.

SUMMARY OF CHARACTERISTICS

KEY CHARACTERISTIC 1: FAIRNESS AND ACCURACY

Environmental education materials should be fair and accurate in describing environmental problems, issues, and conditions, and in reflecting the diversity of perspectives on them.

FACTUAL ACCURACY

Environmental education materials should reflect sound theories and well-documented facts about subjects and issues.

What to look for:

- Sources of factual information are clearly referenced.
- Data are drawn from current and identified sources of information. (Knowing the source of information can aid in judging its trustworthiness or identifying possible bias.)
- Factual information is presented in language that is appropriate for educating rather than for propagandizing.
- Information comes from primary sources that provide context, documentation, and explanation, rather than from reviews or newspaper articles that provide bits and pieces of arguments or evidence.
- A range of experts in the appropriate fields reviewed the materials or participated in their development. The materials provide a list of the people involved in development and review, and their area of expertise.

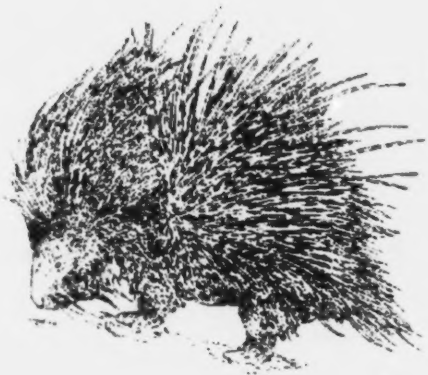
Environmental education materials should foster an understanding and appreciation of environmental concepts, conditions, and issues, as appropriate for different developmental levels.

BALANCED PRESENTATION OF DIFFERING VIEWPOINTS AND THEORIES

Where there are differences of opinion or competing scientific explanations, the range of perspectives should be presented in a balanced way.

What to look for:

- Proponents of differing viewpoints reviewed the materials or helped develop them in another way. The materials list the people involved in development and review, and their organizational affiliation.
- Opinions or policies of an agency or organization are clearly identified.
- Scientifically and socially credible positions and explanations are covered thoroughly, and other positions are also mentioned. (Balanced presentation does not mean giving equal time and space to every opinion or perspective, but treating major positions fairly.)
- Materials communicate areas of consensus among scientists or other experts.



OPENNESS TO INQUIRY

Materials should encourage learners to explore different perspectives and form their own opinions.

What to look for:

- Educators are given tools to use in helping learners to form and express opinions about competing theories.
- Exercises are suggested for helping learners explore personal and societal values and conflicting points of view within the context of the issue.
- Materials encourage an atmosphere of respect for different opinions and an openness to new ideas.
- Exercises encourage learners to understand the opinions of their peers.
- Materials suggest projects that encourage learners to collect and analyze their own data and to compare those data to similar data from other places.
- Activities encourage learners to become discerning readers and observers of media coverage of environmental matters.

REFLECTION OF DIVERSITY

Different cultures, races, genders, social groups, ages, and the like are included with respect and equity.

Different cultures, races, genders, social groups, ages, and the like are included with respect and equity.

What to look for:

- Materials contain descriptions and illustrations that depict people of various races, ethnic groups, genders, and social groups in a respectful and equitable manner.
- Where such variety is appropriate, the content and illustrations depict rural, suburban, and urban settings.
- If material is designed for nationwide use, the content and illustrations reflect appropriate geographic differences.
- Experts in multicultural education and members of historically underrepresented groups such as women and people of color have been involved in the development and review process.
- Readings and additional resources that present concepts and perspectives from different cultures are offered

KEY CHARACTERISTIC 2: DEPTH

Environmental education materials should foster an appreciation for the natural and built environment; an awareness of the feelings, values, attitudes, and perceptions at the heart of environmental issues; and an understanding of environmental concepts, conditions, and issues as are appropriate for different developmental levels.

AWARENESS

Materials should acknowledge that feelings, experiences, attitudes, and perceptions influence how learners process and remember information; and that these factors shape environmental issues and learners' willingness to accept responsibility for exploring, analyzing, and resolving them.

What to look for:

- As appropriate for the developmental level, opportunities are provided for learners to explore the world around them.
- Activities provide opportunities for experiences that increase learners' awareness of the natural and built environment.
- Materials help learners appreciate the interdependence of all life forms and the dependence of human life on the resources of the planet and on a healthful environment.
- Exercises and activities encourage students to identify and express their own positions on environmental issues.

> ***Materials should acknowledge that feelings, experiences, attitudes, and perceptions influence how learners process and remember information...***

FOCUS ON CONCEPTS

Rather than presenting a series of facts, materials should use unifying themes and important concepts.

What to look for:

- Concepts from the environmental sciences—ecology, earth science, chemistry, conservation biology, and the like—are presented and are appropriate for the intended developmental level.
- Concepts from the social sciences—economics, anthropology, sociology, and political science—are presented and are appropriate for the intended developmental level.
- Facts are presented that support important concepts and vocabulary words are introduced and defined in context.
- Ideas are presented logically and are connected throughout the materials, emphasizing a depth of understanding rather than encyclopedic breadth.

- Materials include a clearly articulated conceptual framework that states the concepts to be learned and relates them to each other.

CONCEPTS IN CONTEXT

Environmental concepts should be set in a context that includes social and economic as well as ecological aspects.

What to look for:

- Environmental issues are explained in terms of specific concepts.
- Historical, ethical, cultural, geographic, economic, and sociopolitical relationships are addressed and are appropriate.
- Learners are offered opportunities to examine multiple perspectives on the issue and to gain an understanding of the complexity of issues, as appropriate for their developmental level.
- Further investigations help learners probe more deeply into the ecological, social, and economic aspects of issues and their interrelationships.
- Concepts are introduced through experiences relevant to learners' lives.
- Materials help learners make connections between concepts.
- Learning is based on students constructing knowledge through research, discussion, and application to gain conceptual understanding.

ATTENTION TO DIFFERENT SCALES

Environmental issues should be explored using a variety of scales, as appropriate; for example, short to long time spans, local to global effects, and local to international community levels.

What to look for:

- Materials consider communities of different graphic scales. These scales include the local, regional, national, and global levels.
- Linkages are clear among communities at all levels.
- Local, regional, continental, and global geographic scales are used to help learners understand that issues can be important, widespread, and complex.
- Materials examine issues over a variety of temporal scales so that short-term and long-term problems, actions, and impacts are clear.

KEY CHARACTERISTIC 3: EMPHASIS ON SKILLS BUILDING

Environmental education materials should build lifelong skills that enable learners to prevent and address environmental issues.

CRITICAL AND CREATIVE THINKING

Learners should be challenged to use and improve their critical thinking and creative skills.

What to look for:

- Materials offer learners opportunities to practice critical thinking processes such as problem definition; hypothesis formation; information collection, organization, analysis, and synthesis; drawing conclusions, formulating possible solutions, and identifying opportunities for action.
- Materials encourage learners to practice creative thinking processes such as modeling, using metaphors and analogies, and formulating questions.
- Learners are challenged to use higher-level thinking processes such as identifying bias, inferring, relating, applying, and reflecting.
- Materials provide guidance for judging the validity of various sources of information, and learners are encouraged to apply these guidelines.
- Learners are given opportunities to practice these skills individually and in groups.

Students should learn to arrive at their own conclusions about what needs to be done on the basis of thorough research and study, rather than being taught that a certain course of action is best.

APPLYING SKILLS TO ISSUES

Students should learn to arrive at their own conclusions about what needs to be done on the basis of thorough research and study, rather than being taught that a certain course of action is best.

What to look for:

- Materials help students learn to identify, define, and evaluate issues on the basis of evidence and different perspectives. Ethical and value considerations are included.
- Materials contain a list of organizations and other resources that learners can use to explore the issue on their own, as appropriate for their developmental level. The list should include groups and resources that have various perspectives.

BEST COPY AVAILABLE

- There are opportunities to use different methods for evaluating environmental issues and their potential solutions, as appropriate for the intended age level. These methods may include risk analysis, cost/benefit analysis, ethical analysis, environmental impact analysis, analysis of cumulative effects, different kinds of economic analyses, social impact analysis, and the like. Materials help learners understand the strengths, weaknesses, and biases of these different means of evaluating an issue.
- Learners are encouraged to develop their own solutions to issues.
- Environmental issues are presented with a range of possible solutions as well as information about how the problems are currently being addressed. Materials compel learners to consider the implications of different approaches.

Environmental issues are presented with a range of possible solutions as well as information about how the problems are currently being addressed.

ACTION SKILLS

Learners should gain basic skills to participate in resolving environmental issues.

What to look for:

- Materials give learners an opportunity to learn basic skills for addressing environmental issues, as appropriate for the intended age level. These skills may include defining an issue, determining if action is warranted, identifying others involved in the issue, selecting appropriate action strategies and understanding their likely consequences, creating an action plan, evaluating an action plan, implementing an action plan, and evaluating results.
- Learners are challenged to hone their ability to forecast and to plan for the long term.

- Learners are encouraged to practice interpersonal and communications skills, including oral and written communication, group cooperation, leadership, conflict resolution, and others.

- Learners are given opportunities to develop a variety of citizenship skills, including participation in the political or regulatory process, consumer action, using the media, and community service.

- Materials and activities help students sharpen basic laboratory and field skills such as experimental design, observation, data collection, and data analysis.

- Materials encourage students to learn basic skills of applied science, including environmental monitoring, evaluating the research of others, and setting up an independent research proposal.

- Learners are instructed in the use various forms of technology that help them develop and apply their skills. Such technologies may include computers and electronic communication networks, data gathering equipment, video equipment, and so on.

KEY CHARACTERISTIC 4: ACTION ORIENTATION

Environmental education materials should promote civic responsibility by encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for environmental problem-solving and action.

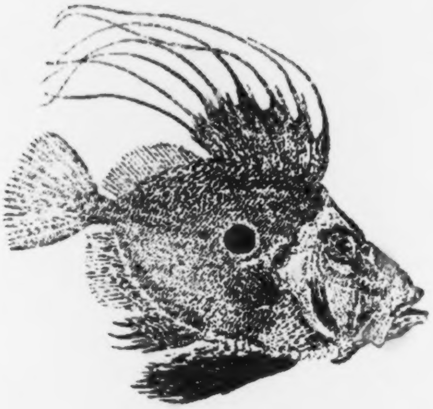
SENSE OF PERSONAL STAKE AND RESPONSIBILITY

Materials should encourage learners to examine how their behavior can have consequences for the environment and evaluate the choices they can make that may help resolve environmental issues.

Materials should encourage learners to examine how their behavior can have consequences for the environment and evaluate the choices they can make that may help resolve environmental issues.

What to look for:

- Materials that promote intergenerational and global responsibility, that link historic and current actions with future and distant consequences.
- Learners are given opportunities to reflect on the effects of their actions and to sort out their opinions about what, if anything, they should do differently.
- Materials that contain examples of people of different ages, races, genders, cultures, and educational and income levels who have made a difference by taking responsible action.
- Materials that convey the idea that many individual actions have cumulative effects, both in creating and addressing environmental issues.

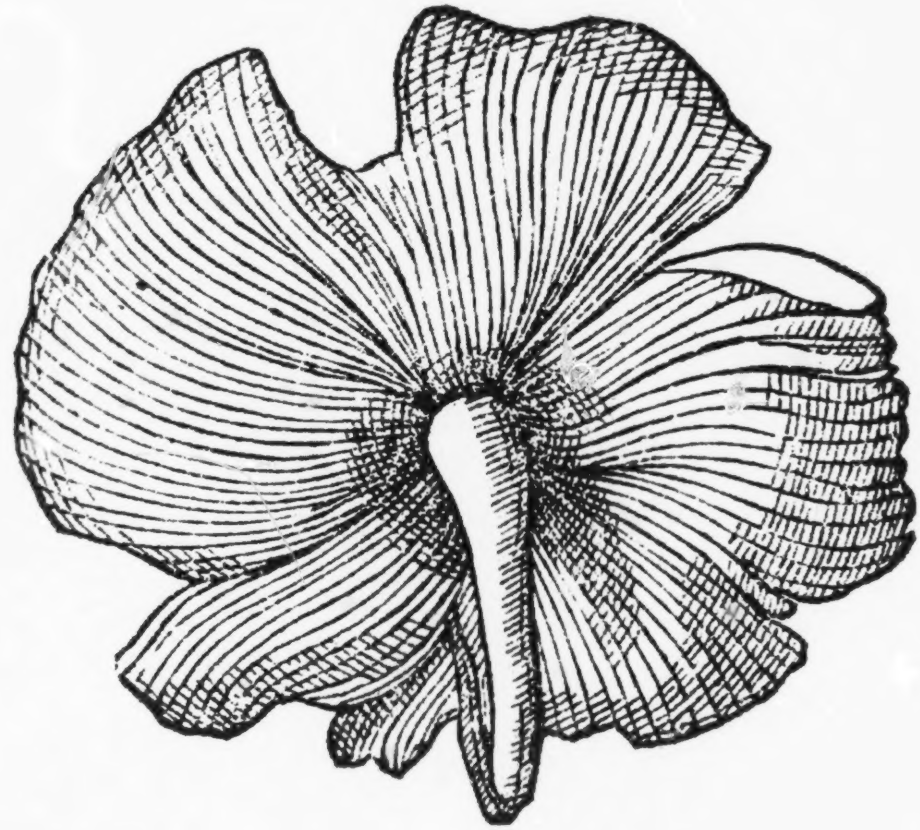


SELF-EFFICACY

Materials should aim to strengthen learners' perceptions of their ability to influence the outcome of a situation.

What to look for:

- Materials that challenge learners to apply their thinking and act on their conclusions.
- Materials that include a variety of individual and community strategies for citizen involvement and provide learners with opportunities to practice these strategies through projects they generate individually, in their school, or in the larger community.
- Examples of successful individual and collective actions. Learners are encouraged to examine what made these actions successful. (Where actions were not successful, students are encouraged to examine the reasons for failure.)
- Learners are encouraged to share the results of their actions with peers and other interested people.



Key Characteristic 5: Instructional Soundness

Environmental education materials should rely on instructional techniques that create an effective learning environment.

Learner-centered Instruction

When appropriate, learning should be based on learners' interests and their ability to construct knowledge to gain conceptual understanding.

What to look for:

- Activities that allow learners to build on previous knowledge and that lead to further learning.
- Learners gain understanding through research, discussion, application, and practical experiences.
- Instruction that encourages learners to undertake their own inquiry. Where appropriate, activities and projects that use learners' questions and concerns as a starting point.
- Materials that encourage learner participation in planning and assessing the learning and materials that encourage learners' reflection on the process and content of learning.

When appropriate, learning should be based on learners' interests and their ability to construct knowledge to gain conceptual understanding.

Different Ways of Learning

Materials should offer opportunities for different modes of teaching and learning.

What to look for:

- Materials that encourage educators to experiment with a range of instructional methods to reach learners with a variety of learning styles. These techniques may include research, experimentation, observation, lecture, discussion, creative expression, field studies, role playing, independent work, cooperative learning, cross-age teaching, and so on.
- Important concepts that are conveyed in more than one way (visual, auditory, and tactile) so that all students can understand them.
- Materials and activities that are developmentally appropriate for the designated grade, yet are sensitive to individual differences in educational experience and learning mode.
- Opportunities that help students learn from expression and experience; for example, using music, art, poetry, and drama; or

involving parents, families, and the community in learning activities.

- Diverse sensory involvement as a criterion for selecting learning activities.

- Challenges to learners to obtain different skills that reflect their multiple intelligences.
- Learning that is accessible to students with limited English proficiency.

CONNECTION TO LEARNERS' EVERYDAY LIVES

Materials should present information and ideas in a way that is relevant to learners.

What to look for:

- Concepts to be taught are directly related to students' experiences.

- Case studies and examples that are relevant to a learner. If material is designed for use in a specific area of a country, the content and illustrations are appropriate for that area.
- Instructional materials that are easy for students to use and understand.
- Content and associated activities are presented in a way that encourages students to have enjoyable learning experiences.

- Materials that provide for continuing involvement throughout the year by the learner both at home and at school. Ways to involve learners' families or caregivers are suggested.

EXPANDED LEARNING ENVIRONMENT

Students should learn in environments that extend beyond the boundaries of the classroom.

What to look for:

- Students can learn in diverse environments that include schoolyards, laboratories, field settings, communities, and other settings beyond the classroom.
- Learners are encouraged to share their knowledge and their work with others.
- Materials that use examples that reflect real-world experiences.

- Materials that suggest partnerships to explore a local issue with local civic organizations, businesses, religious communities, or governments.
- Partnerships with local universities, colleges, or technical schools that encourage learners to participate in research, environmental monitoring, creative projects, and the like.
- Materials that suggest experiential learning activities in which students immerse themselves in an activity outside the classroom—tracking a wild animal, for example, or interviewing people on different sides of a community controversy.
- Materials that suggest linkages to informal, experiential, and service-learning opportunities in the community.
- Inclusion of written materials and other resources for further study.

INTERDISCIPLINARY

The materials should recognize the interdisciplinary nature of environmental education.

What to look for:

- Materials that clearly list the subject disciplines integrated into each lesson or lessons and suggest tie-ins with other subject areas such as the sciences, social studies, math, geography, English, arts, physical education, occupational education, and so on.
- Material that helps develop skills that are useful in other subject areas such as reading comprehension, math, writing, and map reading and analysis.
- Where appropriate, materials are keyed to national standards for other disciplines or standards that have been adopted by a school district or state.

GOALS AND OBJECTIVES

Goals and objectives for the materials should be clearly spelled out.

What to look for:

- Goals and objectives for learner outcomes that are clearly stated.
- Content that is appropriate for achieving these objectives and steps for accomplishing the objectives are identified in written lesson or activity plans.
- Instructional methods that are appropriate to the guide's goals.
- Objectives that match the goals and objectives of general education.

APPROPRIATENESS FOR SPECIFIC LEARNING SETTINGS

Claims about the material's appropriateness for the target grade level(s) and implementation of activities should be consistent with the experience of educators.

What to look for:

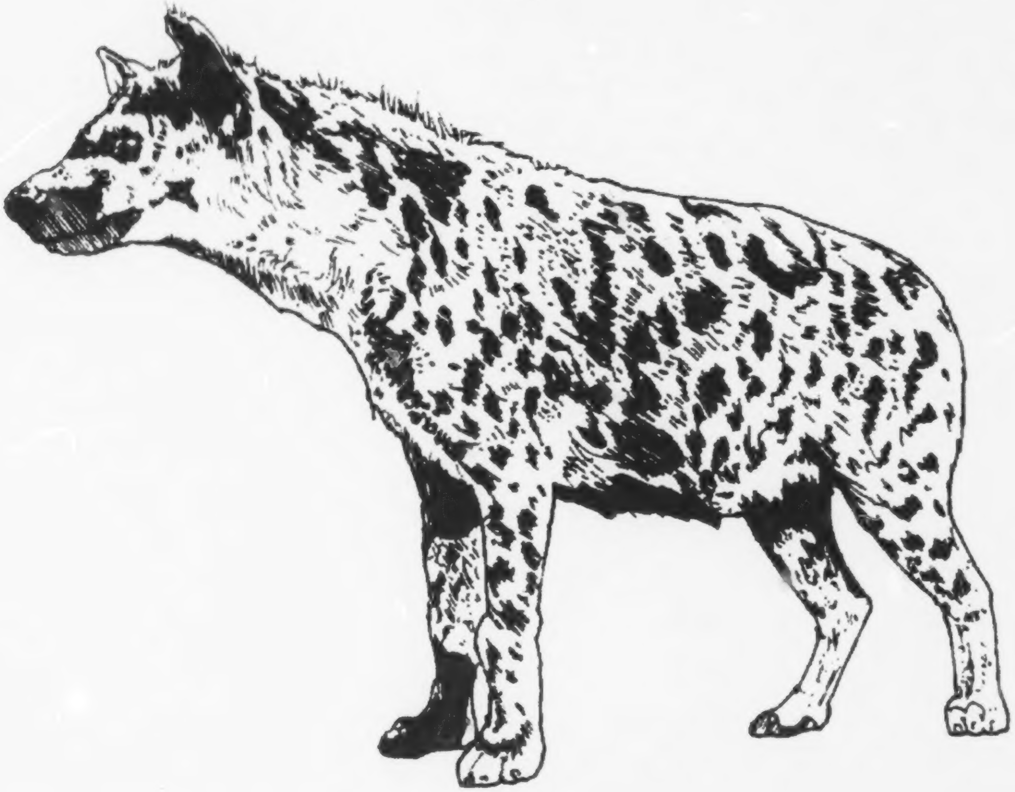
- Appropriate content (i.e., level and language) for the target grade levels. The examples, terminology, and comparisons used are within the probable vocabulary and experience of students.
- Lesson-related activities that can be accomplished in the time specified, with resources available.
- Experiments and activities that appear to be relevant, accurate, predictable, and suitable for the target grade levels. Materials include suggestions for appropriate variations and extensions.
- Activities that are efficient. The amount of time required is consistent with the importance of what is to be learned.
- Environmental responsibility that is modeled in the design, underlying philosophy, and suggested activities of the lessons and materials.

ASSESSMENT

A variety of means for assessing learner progress should be included in the materials.

What to look for:

- Materials that state expected learner outcomes and provide examples of how to use specific performance-based assessments such as portfolios, open-ended questions, group or independent research, or other appropriate projects to indicate mastery.
- Learner outcomes that are tied to the goals and objectives.
- Means of assessing learners' baseline understandings, skills, and concepts are included at the beginning of each lesson.
- Materials that use current educational assessment techniques.
- Suggested assessment techniques that are practical and efficient.
- Assessment that is on-going and tied to student learning.
- Expectations that are made clear to students at the onset of an activity.
- Students are encouraged to assess their own and other students' work.



KEY CHARACTERISTIC 6: USABILITY

Environmental education materials should be well-designed and easy to use.

CLARITY AND LOGIC

The overall structure (i.e., purpose, direction, and logic of presentation) should be clear to educators and learners.

What to look for:

- Materials that are written in a clear and engaging manner. Main concepts are well-articulated. Examples in the text are appropriate to the content and are easily understood.
- Instructions for educators that are clear and concise.
- The following information is included in a straightforward manner:
  - Intended audience/grade level;
  - Instructional setting and optimal number of learners;
  - Disciplines and concepts covered;
  - Intended learner outcomes;
  - Process skills addressed (i.e., observing, communicating, comparing, ordering, categorizing, relating, inferring, applying)
  - Equipment needed;
  - Safety precautions, if appropriate;
  - Time needed for an activity;
  - Brief overview of an activity;
  - Instructions for conducting an activity;
  - Suggestions for assessing an activity; and
  - Pre-activities and post-activities, such as suggestions for enrichment, if appropriate.
- Background information that is adequate and accurate for the educator and a listing of additional resources.
- Materials that are organized sequentially and in an easy-to-use fashion.
- Laboratory and field work, and other activities that are clearly linked to related content material.

Environmental education materials should be well-designed and easy to use.

EASY TO USE

Materials should be inviting and easy to use.

What to look for:

- The layout of materials is interesting and appealing for educators and learners.
- Illustrations, photographs, maps, graphs, and charts that are useful, clear, and easy to read.
- The material is easy for educators to keep and use; for example, 8.5" by 11", 3-hole punched, able to lie flat on a desk.
- Master copies for student handouts and overhead transparencies can be easily duplicated.
- Copyright is spelled out or permission to copy is granted.
- Where appropriate, materials are available in electronic form such as a computer file, CD-ROM, or through the Internet.

LONG LIVED

Materials should have a life span that extends beyond one use.

What to look for:

- Materials that include information on where replacements, updates, equipment, and special supplies can be obtained.
- Equipment and materials are listed, reasonably accessible, inexpensive, and simple to use.
- Student materials are sufficiently supplied. Consumable instructional materials are of good quality and sufficient quantity to support the objectives.
- Nonconsumable materials can be reused by another educator.

ADAPTABLE

Materials should be adaptable to a range of learning situations.

What to look for:

- Suggestions are provided for adapting lessons and activities for learners from particular ethnic or cultural backgrounds.
- Materials that are available in more than one language, if appropriate.

- Where appropriate, materials suggest easy adaptations for different environments, such as for use indoors and outdoors; formal and non-formal settings; large and small classes; mixed-level classes; or rural, suburban, and urban settings.
- Suggestions are offered for finding low-cost or no-cost alternatives for the equipment and materials needed.
- Materials that provide suggestions for adaptations for students with special learning needs, language needs, and physical needs.
- Materials that offer ideas for adapting to different grade levels.

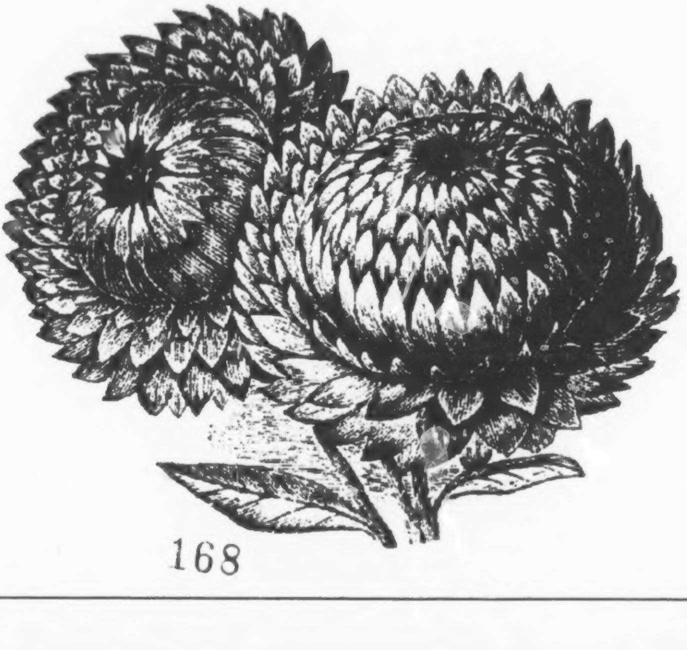
What to look for... materials that include lists of essential resource and supporting materials, such as agency contacts, references to videos, information on computer databases, and the like.

ACCOMPANIED BY INSTRUCTION AND SUPPORT

Additional support and instruction should be provided to meet educators' needs.

What to look for:

- Professional development programs that are accessible to educators in your area.
- Continuing technical support for educators is provided (e.g., a toll-free telephone number or a list of local or regional points of contact for questions about the materials).
- Instructional programs that provide follow-up activities or evaluations and help develop a network of practitioners.
- Materials that include lists of essential resource and supporting materials, such as agency contacts, references to videos, information on computer databases, and the like.



MAKE SUBSTANTIATED CLAIMS

Materials should accomplish what they claim to accomplish.

What to look for:

- Claims of learning outcomes that are substantiated by systematic evaluation rather than merely by letters of endorsement and anecdotal comments from users.
- Materials that were field-tested under conditions similar to their intended use and evaluated in terms of stated goals and objectives prior to wide-scale implementation.
- If materials are part of a larger program, the program provides for continuous feedback and modification once it is underway. Educators who work in the settings in which the material is intended to be used were involved as part of the development team or reviewed drafts of materials.
- Experts in learning theory, evaluation, and other appropriate educational disciplines were involved on the development team or reviewed drafts of materials.

FIT WITH NATIONAL, STATE, OR LOCAL REQUIREMENTS

Environmental education materials should fit within national, state, or local standards or curricula.

What to look for:

- Materials that have been or could be easily correlated with national, state, or local requirements or learning objectives.
- Materials that can be readily integrated into established curricula.

169

GLOSSARY

Affective dimension: An individual's attitudes, beliefs, and values.

Assessment: Measurement of a learner's achievement or progress.

Concept: A general idea or understanding, especially one based on common or related attributes of specific instances. For example, the concept of ecological interdependence—that all living elements of an ecological system depend on the others—is based on knowledge of interrelationships among living things in many specific systems.

Conceptual framework: An organized sequence of ideas that directs teaching toward a focused understanding.

Constructing knowledge (constructivist learning): A guiding philosophy that believes that individuals make meaning of situations for themselves through a dynamic combination of knowledge they already possess, new knowledge presented to them, social interaction, and personal reflection and experience. This personally constructed knowledge by the learner evolves throughout a learner's lifetime. (See D.W. Cheek, *Thinking Constructively about Science, Technology, and Science Education*. SUNY Press, 1992.)

Cost/benefit analysis: An examination of a program that seeks to evaluate the resources expended in relation to the outcome, often noted in financial terms.

Creative thinking: Thinking that results in connections or possibilities previously unrecognized by or unknown to a learner.

Critical thinking: Analysis or consideration that relies on logical methods and deductive reasoning.

Cumulative effects analysis: Estimation of the total effect or likely result of many individual events or actions through a systematic process using as many known facts and factors as possible.

Developmental appropriateness: The suitability of an activity for learners of a certain age or cognitive ability.

Environmental issue: Related to, but distinguished from an environmental problem. An environmental issue reflects the presence of differing perspectives on possible solutions to an environmental problem.

Environmental monitoring: Systematic measurement, over time, of one or more indicators of an ecosystem's stability or health.

Environmental problem: Related to but distinguished from an environmental issue. An environmental problem results from an interaction between human activity and the environment.

Experiential learning: Learning by means of personal experience or direct observation.

Fact/factual information: A verifiable phenomenon or association. Factual information can be consistently corroborated by standardized means.

Global responsibility: A person's accountability for the potential or actual impact of individual actions on the earth and the world community.

Goal: A desired outcome from an activity.

Informal learning opportunities: Situations in which learning can occur without formal or traditional direction from an instructor.

Interdisciplinary: A knowledge view and curriculum approach that applies methodology and language from more than one discipline to examine a central theme, issue, or experience. Related terms include multidisciplinary (juxtaposing several disciplines to focus on one problem with no direct attempt to integrate) and transdisciplinary (beyond the scope of the disciplines; for example, starting with a problem and bringing to bear knowledge from relevant sources).

Intergenerational responsibility: A person's accountability for the potential or actual impact of individual actions on future populations.

Learner-centered instruction: Instructional methods that are driven by the individual needs of the student rather than by externally imposed goals or objectives.

Learner outcomes: The intended cognitive result of an educational program.

Learning styles: The belief that individuals favor particular methods of learning (e.g., oral versus written, self-taught versus group mediated) and can optimize their understanding when such methods are available to them within a learning environment.

Multiple intelligences: A theory advanced by Howard Gardner (see *Multiple Intelligences: The Theory in Practice*. New York: Basic Books, 1993) that classifies cognitive abilities according to seven broadly grouped aptitudes: linguistic intelligence, logical-mathematical intelligence, spatial intelligence, bodily kinesthetic intelligence, musical intelligence, interpersonal intelligence, and intrapersonal intelligence.

Objective: A statement of a specific measurable or observable result desired from an activity.

Risk analysis: An activity that seeks to predict the overall results or broad consequences and degree of impact, whether beneficial or not, of a given project or activity.

Self-efficacy: One's ability or attitude about that ability that serves as a catalyst or agent of change in one's life and in situations involving others.

Service learning: Learning in which a student takes part in a project or activity that is beneficial to some segment of the community.

Journal of Environmental Education 21(4): 27-32, 1990.

Elementary Schools in Rural Honduras

Problems in Exporting Environmental Education Models from the United States

SAM H. HAM and LIZETH CASTILLO

ABSTRACT: A study of elementary school teachers in rural Honduras was conducted to determine the best approaches for developing environmental education materials and teach training programs for those schools. Four findings revealed wide differences between schools in the United States and those in the study area: (1) rural Honduran teachers had no more than a high school education, and about half had nine or fewer years of formal schooling; (2) dropout rates are high in rural Honduras—75% by Grade 4 and 84% by Grade 6; (3) teachers in rural Honduras usually teach more than one grade level in the same classroom, and often three to six grades at a time in very remote areas; and (4) rural Honduran schools do not have telephones, plumbing, electricity, photocopying facilities, or easy access to basic teaching materials such as string, paper, glue, sicssors, crayons, etc. These results suggest that U.S. environmental education models and materials may be based on assumptions about U.S. schools that do not hold in developing countries. The practice of simply translating materials for use in these countries may not contribute to the growth of environmental education in the developing world. A better approach would be to support in-country development of materials and programs.

Maintaining global biological diversity has emerged as a paramount international conservation issue (United Nations 1987) Governments and private organizations worldwide recognize that biological systems not only sustain today's human populations, but hold the answers to questions we are not yet intelligent enough to ask, and solutions to problems we have not yet had to face. As Dasmann (1968) described it, biological diversity, in this context, has inestimable value as a sort of "life insurance." Developing countries contain much of the world's biological diversity, especially those located in the tropics, where an estimated 50% of the world's plant and animal species reside (Tangley 1988).

Among those actively working to protect global biological diversity are environmental educators in the United States. Equipped with experience and proven methodologies, many have turned their attention to the developing world[1] with hopes of contributing to the growth of environmental education in countries where cadres of trained professionals are only now beginning to amass. Although specialists from many developed countries are involved, the United States seems at the forefront, owing in part to the experience and knowledge it has acquired about environmental education in this country, and in part to the many outstanding programs and environmental teaching materials it has produced over the last 30 years. It is with

BEST COPY AVAILABLE

JOURNAL OF ENVIRONMENTAL EDUCATION

these materials and knowledge of environmental education in the developed world that U.S. experts try to augment the practice and growth of environmental education in developing countries.

Having pioneered, and become experienced with, models and materials for U.S. environmental education, U.S. educators naturally tend to want to"export" these programs and materials to other countries, either intact or as translated facsimiles. Such as approach makes sense because it capitalizes on past efforts and extends to teachers in developing countries the benefits of decades of development, testing, and improvement that have culminated in these educational programs. It is also a way to provide educators in developing countries with resources they cannot acquire otherwise and do not have the financial resources to develop locally.

The Problem

As laudable as these "export" efforts are, they seem based on an underlying assumption that language differences constitute the only obstacle to effective implementation of these materials in other countries. Hence, it is not uncommon these days for well-intentioned environmental educators in the United States to seek financing to translate and export U.S.-based environmental education materials to developing countries. And increasingly, translated activity guides are turning up in developing countries, even in remote areas.

An example of such a guide was sent to the authors from a colleague in Brazil. It dealt with North American predators such as timber wolves and grizzly bears. The Brazilian children apparently enjoyed learning aobut these exotic animals but a question was raised concerning whether they should be learning, instead, about the beleaguered predators in *their own country* that are quickly losing habitat to unplanned development and accelerating deforestation. It seems logical that before a country can prudently manage its own biological diversity, its people must be knowledgeable about the species that exist *there*.

A Peace Corps volunteer in Honduras remarked that she thought rural Honduran children knew much more about African and North American wildlife than they did about Honduran wildlife. This occurred, she said, because the only wildlife picutres the children ever saw were from magazines and calendars that *gringos* had given them or their teachers (Schmidt 1987). Schools in developing countries usually cannot afford the costs of wildlife posters, magazines, and picture books and evn if they could, surprisingly few depicting local fauna are available. In the absence of photographs of native fauna, the children may tragically come to believe that wildlife live in other places, but not where they live.

The dissimilarity between the United States and developing countries does not stop with their biophysical environments. Vast differences may also exist in their respective elementary school systems. In the United States, we generally assume that our primary schools are staffed by teachers who hold at least a bachelor's degree. We assume that most students finish at least 12 years of school and that what is learned in a particular grade at one school is usually similar to what is taught in the same grade at a different school. We also assume that, except for isolated cases, most U.S. schools have at least one teacher and one classroom for each grade. U.S. schools also generally take for granted access to electricity, plumbing, blackboards, chalk, pencils, paper, glue, scissors, crayons, photocopying facilities, textbooks, teachers' guides, and student workbooks.

Indeed, careful analysis of the things we take for granted in our own educational system may reveal major differences between our teachers, students, and classrooms and those in developing countries. And because development of our environmental education models and materials is based implicitly on these assumptions, we might question, as some have, whether translated materials originally intended for application in U.S. settings are going to be as effective when applied in countries where these assumptions do not hold (see for example, Wood and Wood 1987, and United Nations 1980). If such is the case, we might consider alternative ways to provide needed assistance in international environmental education development—ways other than sending materials intended for use in U.S. schools.

Honduran Case Study

The need for this viewpoint is illustrated by data collected in Honduras by Ham and Castillo (1988) in which rural elementary teachers (Grades 1 to 6) were interviewed in order to determine approaches for developing environmental education materials and teacher training programs for those schools. As part of a USAID (U.S. Agency for

---

Sam H. Ham *is an associate professor with the Department of Wildland Recreation Management, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, Idaho.* **Lizeth Castillo** *is an environmental educator with the Land-Use Productivity Enhancement Project, U.S. Agency for International Development, Tegucigalpa, Honduras.* *Research supported by the U.S. Agency for International Development, Tegucigalpa, Honduras. Published as contribution No. 538 of the Idaho Forest, Wildlife and Range Experiment Station, College of Forestry, Wildlife and Range Sciences, University of Idaho.*

International Development) forestry development project, the study was conducted to learn about the schools, teachers, and students in the La Union, Olancho region of rural Honduras so that usable and effective materials and related in-service training programs could be designed in concert with natural resource development activities. Selected results of this study are presented in the following discussion. Readers interested in more comprehensive treatments are referred to Ham and Castillo (1988) and Castillo (1989).

Research Methods

Interviews were conducted with a random sample of 49 elementary teachers during the period 28 June through 1 August 1988. The sample comprised 71% of all elementary teachers in the La Unión region (49 of 69), yielding a confidence interval of no less than 95%. The 49 teachers each taught one or more grades (1 to 6) and came from 32 different schools in the region.

Interviews were arranged in advance with the assistance of the Honduran Ministry of Public Education and the Honduran Ecological Association. Unless circumstances dictated otherwise, all interviews were conducted on the school site itself, allowing observation of the school's physical setting, classroom facilities, and available teaching resources.

To structure the interview and minimize bias, a standard interview form was used. Pretesting was conducted both at the University of Idaho using a Honduran teacher as a subject, and again in Honduras before data collection began. In addition, meetings with a number of consultants were held to critically evaluate and refine the interview content and procedures prior to field work.

The interviews were conducted by a native Honduran who at the time was a graduate student at the University of Idaho. Interviews lasted an average of 45 minutes depending on the amount of discussion on open-ended questions. The longest was about 1.5 hours. There were no refusals.

Pertinent Results and Discussions

The interviews revealed wide differences between U.S. and rural Honduran elementary schools. A striking dissimilarity was found in the educational level of teachers. Whereas we assume that teachers in U.S. schools usually have at least a bachelor's degree, none of the Honduran teachers had more that a high school education, and nearly half had completed nine or fewer years of formal school (Table 1). Even considering that most of them have completed additional teacher training courses (a requirement for teacher certification in Honduras), their basic reading, comprehension, and computational skills might not be sufficient for environmental education materials geared to a college-educated reader. Combined with culture-dependent descriptions, examples, and analogies typically contained in environmental education guides, this difference in education could render many U.S.-based materials difficult to comprehend if not culturally distant, regardless of how well they might be translated.

A second major difference was enrollment patterns. In rural Honduras, many children do not attend school at all. Those who do often drop out before the sixth grade in order to assist their families in household and sustenance activities. Dramatic declines in enrollment between the first and third grades, and again between the third and sixth grades, were discovered in the school we contacted (see Table 2). Of the number of children enrolled in the first grade, only 25% of that class were attending school by the fourth grade. By Grade 6, only 16% of the original enrollment remained—a decline of 84%. Modular environmental education programs based on grade levels stand to miss 75% of the children by Grade 4 and 84% by Grade 6 in rural Honduras. In addition, because many such programs begin with an affective/conceptual orientation and gradually build to more applied, problem-solving orientations in later grades, most children in rural Honduras would never advance to the application stage.

TABLE 1.—Number of Years of School Completed by Rural Honduran Elementary Teachers

Number of years	Frequency	Percentage
6	13	26.5
7	1	2.0
9	9	18.4
11	1	2.0
12	25	51.0
Totals	**49**	**99.9**

TABLE 2.—Number of Children Enrolled in Each Grade Level Compared to Total First-Grade Enrollment

Grade level	Number of children	(%)	Percentage of first-grade enrollment
1st	762	(38.8)	100.0
2nd	424	(21.5)	55.6
3rd	268	(13.6)	35.2
4th	194	(9.9)	25.4
5th	196	(10.0)	25.7
6th	121	(6.2)	15.9
Totals	**1,965**	**(100.0)**	

JOURNAL OF ENVIRONMENTAL EDUCATION

Yet, as Medina (1989, p. 3) has argued, Latin American children and their families must learn to solve problems quickly if tropical forests are to be conserved.

> The averge South American does not go beyond the 4th grade in school. Latin America and the Caribbean do not have the luxury to wait for today's children to grow up. Unless their behaviors change now there will be little tropical forest left to save.

Medina brings to light an important realization for U.S. environmentalists wishing to assist in the growth of environmental education in developing countries: children in those countries, and their families, must learn now how to make their living from natural resources without destroying the biological systems that provide them. Beyond teaching concepts and respect for nature, Medina and others have stressed that environmental education in developing countries must demonstrate economically viable alternatives to destructive land uses while still preserving the traditions and dignity of local people. Environmental education in developed countries like the United States has not adopted such an emphasis because their problems are usually different from those faced by developing nations.

A third difference between U.S. and rural Honduran schools was related to class composition. Whereas in the United States we usually expect there will be students of only one grade level in each class (although exceptions exist), most of the 49 teachers we interviewed taught two or more grade levels at a time in the same classroom (see Table 3). Carrying out class discussions under such circumstances could be impossible, as the conversation of one group of children might disturb the work of other children in the classroom. For a teacher who instructs only two grades (e.g., Grades 1 and 2, or 3 and 4, etc.), carefully controlled discussions might be possible under some circumstances. However, over half of the teachers teach three or more grades, and, in two very remote schools, the same teacher has children of all six grades in the same classroom. According to these teachers, everyday teaching is logistically complex and discussions are usually impossible. Yet many U.S. environmental education activities stress discussion and group "information processing." In rural Honduran classrooms, these activities would be difficult, if not disruptive, to carry out.

A fourth difference between U.S. and rural Honduran schools as the amount of resources and facilities available in the schools. U.S. environmental education activities frequently require a variety of materials (e.g., string, paper, scissors, glue, etc.). Even though such materials may be considered common and inexpensive in U.S. schools, rural Honduran teachers cannot count on their availability. Similarly, none of the schools had telephones, plumbing, electricity, facilities for photocopying or other means of reproducing printed material. Environmental education activities that presume access to these materials and services would be impractical in rural Honduras.

Conclusions and Recommendations

Advances in environmental education have spawned the development of many excellent programs and activity guides for use in U.S. settings. Yet the success of these materials in U.S. schools does not guarantee they will be successful or even appropriate ins chools outside the United States. Data from rural Honduran elementary schools suggest that differences in language and the biophysical environment may not be the only obstacles to implementing these materials in developing countries. Depending on the country, wide differences may exist in teachers' educational backgrounds, school enrollment patterns, class composition, and in the materials and facilities available to teachers for everyday instruction. U.S.-based environmental education programs usually assume college-educated teachers, continuous enrollment between Grades 1 and 12, one grade level per classroom, and the availability of basic teaching resources and services such as electricity, plumbing, and photocopying facilities. Based on the data reported here, it would seem that such programs, regardless of how well suited they are to U.S. schools, would face serious obstacles in rural Honduras and in similar situations elsewhere.

As many writers have argued (e.g., Schmieder 1977); Barcena 1987; Brown and Maguire 1986; Nations and Leonard 1986; and United Nations 1980), it is not usually possible to simply transfer institutional models from developed to developing countries without substantial modification and adaptation. According to Barcena (1977) and Galeano (1973), this is simply because the priorities of these countries are different. In many developing countries, enviornmental problems are caused not just by a lack

TABLE 3.—Number of Grade Levels Taught in the Same Classroom by Each Teacher

Number of grade levels taught in same room	Number of teachers	Percentage
1	20	40.8
2	4	8.2
3	6	12.2
4	12	24.5
5	5	10.2
6	2	4.1
Totals	**49**	**100.0**

of knowledge among citizens, but even more by a lack of commitment among decisionmakers, inequitable land ownership, and the related pressures of a growing population and declining resource base (Nations and Leonard 1986). As Medina (1989) and others have argued, if education is to attack environmental degradation at the root, it must address these issues directly as part of a comprehensive program of sustainable development. U.S. environmental education programs do not adopt this perspective because conservation priorities in the United States are different.

A superior strategy to exporting U.S. materials to other countries is to assist these countries in developing their own approaches to environmental education. Often it is *they* who are most eager to pick up U.S.-based materials and put them to use in their schools, not because the materials are germane to local environmental education needs, but because they are all that is available (see, for example, McCrea and Greenberg 1988). Sometimes, foreign students who have studied at U.S. universities return better prepared to operate in U.S. programs than in programs in their own country. A natural tendency for these students is to take home and apply those ideas and materials with which they are most comfortable. Recognizing these tendencies, Wood and Wood (1987), in collaboration with the International Institute for Environment and Development and the U.S. Fish and Wildlife Service, produced a procedural guide for developing conservation education programs. Printed both in English and Spanish, the Woods' guide stresses the need for designing programs that are specific to local people, local environments, and to local environmental education needs. What they present is not a compendium of activities but rather a process that any country (including developed countries) can use to analyze its own needs and develop strategies for achieving the desired outcomes of an environmental education program. U.S. educators who wish to assist developing countries in environmental education might begin by becoming familiar with the Woods' approach.

U.S. universities also need to do a better job of adapting conventional course content to the needs of their international students. Students from developing countries must be encouraged to question what they are taught in U.S. classrooms because not all of it is applicable in their countries. They come to U.S. universities highly motivated, yet are sometimes too eager to learn quick solutions because the problems they face at home are immense, and they sense that time is short. The result is that they sometimes accept too readily concepts and ideologies that do not really fit the situaiton in their countries. On the other hand, there are many usable ideas not only in the United States but across the world that could prove valuable if adapted to local needs and conditions. A good example is an effort by Costa Rican teachers and faculty at the National University to develop environmental learning activities based on Project Wild methodologies that takes advantage of the successful teaching strategies *Project Wild* has developed (UNA 1989) but goes beyond mere translation of the U.S. *Project Wild* materials.

In the United States, foreign students and their professors need to sample ideas and arrive together at conclusions about their suitability and feasibility in the student's country. Establishing national and regional repositories of environmental education literature and teaching materials in developing countries represents a good strategy for making these ideas available not only to universities but to in-country environmental educators and others involved in public communication programs dealing with environmental or natural resource topics (e.g., extension specialists, private conservation groups, protected area managers, interpretive specialists, Peace Corps volunteers, and mass media personnel).

Efforts to export U.S. environmental education programs to developing countries have to some extent been fueled by the lack of financing for in-country program development. While such financing remains a problem, there are signs that traditional funding sources (e.g., development agencies, international banks, private conservation organizations, and U.N. organizations) are recognizing environmental education as a legitimate part of development projects. An example is a new U.S. Agency for International Development natural resource management program in Central America that will include an environmental awareness component. U.S. experts who become familiar with conventional funding mechanisms, as well as with newer ones such as "debt-for-nature swaps," are better able to help developing countries help themselves by pointing them to financial resources for supporting in-country development and maintenance of environmental education programs.

Note on Study Limitations

Socioeconomically, the La Unión region of Honduras is representative of other rural areas in that country, and probably of rural Latin America in general with the probable exception of Costa Rica. However, there is no intent to imply here that schools in rural Honduras are necessarily equivalent to urban educational systems. Though many similarities in teachers' backgrounds and funding scenarios probably exist, access to basic services and facilities (e.g., plumbing, electricity, photocopying, etc.) is often commonplace in cities.

Nevertheless, a sizable portion of Central Amaerica is rural. Honduras, in fact, is 60% rural (Leonard 1987).

JOURNAL OF ENVIRONMENTAL EDUCATION

Therefore, environmental education development in rural areas promises to reach a significant portion of the population in Central America. In addition, many of Central America's environmental problems (e.g., deforestation, soil erosion, contaminated water) are caused by rapidly growing rural populations inhabiting lands containing natural resources. As these populations grow up, they develop lifelong perceptions, values, and behaviors toward nature and natural resources. Therefore, rural school and community environmental education programs represent an important strategy for mitigating environmental problems and improving Central America's environmental future.

REFERENCES

Barcena, A. 1987. Reflexiones sobre la incorporación ambiental en el marco institucional y operativo del sector público en América Latina y el Caribe. *In Reunión de Consulta con Organismos Públicos Responsables de la Protección Ambiental y la Conservación de Resursos Naturales*. Washington, D.C.: Committee on the Environment, Inter-American Development Bank.

Brown, J.W., and A. Maguire. 1986. Saying aye or nay. In *Bordering on trouble: Resources and plitics in Latin America*, edited by A. Maguire and J. W. Brown, 389–414. Bethesda, Md.: Adler and Adler.

Castillo, E. L. R. 1989. Situational analysis for environmental education in rural Honduran elementary schools. Masters thesis, Department of Wildland Recreation Management, University of Idaho.

Dasmann, R. F. 1968. *Environmental conservation*. 2d ed. New York: John Wiley.

Galeano, E. 1973. *Open veins of Latin America: Five centuries of the pillage of a continent*. New York: Monthly Review Press.

Ham, S. H. and L. Castillo. 1988. Situational analysis for environmental education in rural Honduran elementary schools. Final research report to U.S. Agency for International Development, Honduras. Moscow, Id.: College of Forestry, Wildlife and Range Sciences, University of Idaho, Experiment Station Publication No. 440.

Leonard, H. J. 1987. Recursos naturales y desarrollo económico en América Centarl: Un perfil ambiental regional. San Jose, Costa Rica: Centro Agronómico Tropical de Investigación y Enseñanza, No. 127

McCrea, E. J., and L. S. Z. Greenberg. 1988. *A directory of selected environmental education materials*. Washington, D.C.: The International Institute for Environment and Development, World Resources Institute.

Medina, G. 1989. *Campesinos and conservation: Joining forces thorugh environmental education*. Washington, D.C.: World Wildlife Fund.

Nations, J., and H. J. Leonard. 1986. Grounds of conflict in Central America. In *Bordering on trouble: Resources and politics in Latin America*, edited by A. Maguire and J W. JBrown, 55-98. Bethesda, Md.: Adler and Adler.

Schmidt, J. 1987. Personal communication. Tela Atlántida, Honduras (11 December).

Schmieder, A. 1977. The nature and philosophy of environmental education: Goals and objectives. In *Trends in environmental education*. Belgium: United Nations Educational, Scientific and Cultural Organization (UNESCO).

Tangley, L. 1988. Studying (and saving) the tropics. *BioScience* 38(6): 375–85.

UNA. 1989. *Taller de educación ambiental para maestros de escuelas situadas en la Cuenca del Río Segund—etapa II*. Heredia, Costa Rica: Facultad de Ciecias Exactas y Naturales, Proyecto Recuperacíon del Rio Segundo, Universidad Nacional.

United Nations. 1987. *Our common future*. Final report of the United Nations World Commission on Environment and Development. New York: Oxford University Press.

United Nations. 1980. *Environmental education in the light of the Tbilisi conference*. Paris: United Nations Educational, Scientific and Cultural Organization (UNESCO).

Wood, D. S., and D. W. Wood. 1987.,*How to plan a conservation education program*. Washington, D.C.: International Institute for Environment and Development/ U.S. Fish and Wildlife Service, Office of International Affairs.

BEST COPY AVAILABLE

Reprinted with permission from the *Journal for Environmental Education* published by Heldref Publications.

RESOURCES AVAILABLE THROUGH ICE

The following materials are available to Peace Corps Volunteers and staff through Peace Corps' Information Collection and Exchange (ICE). Information about ICE publications and services is available through your Peace Corps In-country Resource Center (IRC) or by writing to the following address:

Peace Corps
Information Collection and Exchange
1111 20th Street NW
Washington, DC 20526

Conservation Education: A Planning Guide. David S. Wood and Diane Walton Wood. **M0023**

Environmental Activities For People Who Use English as a Foreign Language. Ruth Perlow. **R0092**

Environmental Education in the Schools—Creating a Program that Works! Judy A. Braus and David Wood. **M0044**

Environmental Education Toolbox Resource Manuals. Martha C. Monroe and David Cappaert, editors.

- ***Approaching Environmental Issues in the Classroom.*** Margaret T. Pennock and Lisa V. Bardwell. **FC218**
- ***Defining Environmental Education.*** John Disinger and Martha Monroe. **FC216**
- ***Designing Effective Workshops.*** Judy A. Braus and Martha Monroe. **FC215**
- ***Evaluating Environmental Education Materials.*** Leeann Tourillott and Peggy Britt. **FC221**
- ***Integrating Environmental Education into the School Curriculum.*** Martha Monroe and David Cappaert. **FC217**
- ***Urban Environmental Education.*** Jeffrey Frank and Michael Zamm. **FC222**
- ***Using Community Resources.*** Nancy A. Osborn. **FC219**
- ***Using Computers in Environmental Education: Interactive Multi-media and On-line Learning.*** W.J. Rocky Rohwedder and Andy Alm. **FC220**

Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets. Sam H. Ham. **FC 190**

NatureScope Amazing Mammals. Judy A. Braus, editor. **FC 235/236**

NatureScope Pollution Problems and Solutions. Judy A. Braus, editor. **FC 227**

Nonformal Education Manual. **M0042**

Open Space Technology: A User Guide. Harrison Owen. **TR103**

Outreach: Materials of Crops and Gardening. **R0100**

Outreach: Materials on Waste and Recycling. **R0096**

PACA: Participatory Analysis for Community Action. **M0053**

Pictorial Apprenticeship Program Handbook: A Project Planning Strategy for Preliterate Communities. Evan Bloom and Sue Reed. **M0047**

Small Projects Design and Management: Training Manual for Volunteers and Counterpart. **T0050**

Tales from Open Space. Harrison Owen. **TR104**

Teaching Conservation in Developing Nations. Judith Brace, Ralph R. White, and Stephen C. Bass. **M0007**

Teaching English as a Foreign Language To Large, Multilevel Classes. **M0046**

Team Problem Solving: Solving Problems Systematically. Sandy Pokras. **TR084**

The 4MAT System: Teaching to Learning Styles with Left/Right Mode Techniques. Bernice McCarthy. **ED187**

The Earthbird Series: Food for the Future, I Am So Hungry I Could Eat a Tree; and Fabulous Forest Factories. Jared C. Crawford. **FC 204**

The World Map Project Handbook. World Wise Schools, Peace Corps. **R0088**

Women in Community Forestry. Mary Rojas. **WD098**

RESOURCES NOT CURRENTLY AVAILABLE FROM ICE

Aquatic Project WILD Activity Guide. Project WILD, 5430 Grosvenor Lane, Bethesda, Maryland 20814 USA.

Environmental Education Materials: Guidelines for Excellence. North American Association for Environmental Education, Publications and Membership Office, P.O. Box 400, Troy, Ohio 45373 USA.

Experiential Learning: Experience as the Source of Learning and Development. David A. Kolb. Prentice Hall, 1984.

Improving Training Quality: A Trainer's Guide to Evaluation, Ramli Mohamed, Yoke-Lim Khor, and Monina Escalada. Agricultural Education and Extension Service, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100, Rome, Italy.

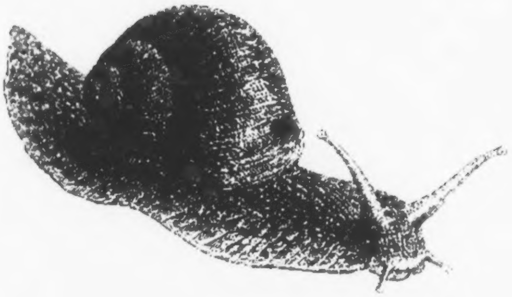
NatureScope India Amazing Mammals. Development and adaptation by Mamata Pandya. Centre for Environmental Education, Nehru Foundation for Development, Thaltej Tekra, Ahmedabad 380054 India.

Project Learning Tree Activity Guide. American Forest Foundation, Project Learning Tree, 1111 19th Street NW, Suite 780, Washington, DC 20036 USA.

Project WET Activity Guide. National Project WET, 201 Culbertson Hall, Montana State University, Bozeman, Montana 59717 USA.

Project WILD Activity Guide. Project WILD, 5430 Grosvenor Lane, Bethesda, Maryland 20814 USA.

Promoting Environmental Education: An Action Handbook for Strengthening EE in Your State or Community. Abby Ruskey and Richard Wilke. North American Association for Environmental Education, Publications and Membership Office, P.O. Box 400, Troy, Ohio 45373 USA.



181

OTHER ADDRESSES AND WORLD WIDE WEB SITES

Good places to search for environmental education materials and information include:

EE-Link
http://eelink.net/

Enviroweb
http://envirolink.org/

U.S. Environmental Protection Agency
401 M Street, NW
Washington, DC 20460 USA
http://www.epa.gov

GLOBE Project
http://www.globe.gov/tsl/welcome.html

Global Rivers Environmental Education Network
206 South 5th Ave.
Suite 150
Ann Arbor, Michigan 48104 USA
http://www.igc.org/green/index.html

ERIC Clearinghouse on Mathematics, Science,
and Environmental Education
http://www.ericse.org

Association for Experiential Education
http://www.princeton.edu/~rcurtis/aee.html

North American Association for Environmental Education
Publications and Membership Office
P.O. Box 400
Troy, Ohio 45373 USA
http://eelink.umich.edu/naaee.html

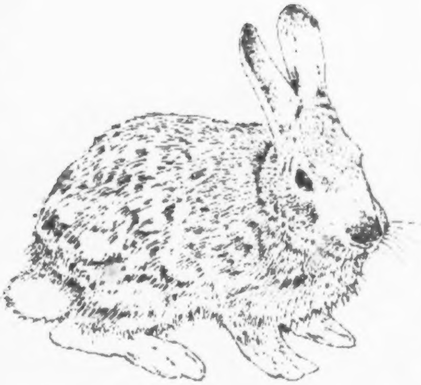
4-H Youth Development Program
University of Minnesota Extension Service
4-H Cooperative Curriculum System
http://www.fourh.umn.edu

National 4-H Program Leader
U.S. Department of Agriculture
Room 3864 South Building
Ag Box 0925
Washington, DC 20250-0925 USA

National Wildlife Federation
8925 Leesburg Pike
Vienna, Virginia 22184-0001 USA
http://www.nwf.org

Project WILD
5430 Grosvenor Lane
Bethesda, Maryland 20814 USA.
http://www.eelink.umich.edu/wild

Project Learning Tree
American Forest Foundation
1111 19th Street, NW
Suite 780
Washington, DC 20036 USA
http://www.plt.org/



World Resources Institute
1709 New York Avenue, NW
Washington, DC 20006 USA
fax: (202) 638-0036
http://www.wri.org

National Project WET
201 Culbertson Hall
Montana State University
Bozeman, Montana 59717 USA

Centre for Environmental Education
Nehru Foundation for Development
Thaltej Tekra
Ahmedabad 380054, India

World Forestry Center
http://www.worldforest.org

Regional Environment Center for Central and Eastern Europe
Ady Endre ut 9-11
2000 Szentendre
Hungary
http://www.rec.org

Food and Agriculture Organization of the United Nations
Via delle Terme di Caracalla
00100, Rome, Italy
http://www.fao.org

World Watch Institute
http://www.worldwatch.org

World Forestry Institute
http://www.vpm.com/wfi

World Wide Fund for Nature
http://www.panda.org

183

World Wildlife Fund
http://www.wwf.org

Publications from the Community Forestry Unit of the Food and Agriculture Organization of the United Nations are available through the following regional coordinators:

Anglophone Africa:
FTPP/FAN
Forest Action Network
P.O. Box 21428
Nairobi, Kenya
Fax: (254-2) 718398
e-mail: fan@arcc.or.ke

Francophone Africa:
Facilitateur Regional pour L'Afrique
Francophone
IPD-AC
Institut Panafricain pour le Developpement
B.P. 4078
Douala, Cameroon
Fax: (237) 403068
e-mail: fitp@sprynet.com

Asia:
FTPP/RECOFTC
Regional Community Forestry Training Center
Kasetsart University
P.O. Box 1111
Bangkok 10903, Thailand
Fax: (66-2) 561-4880
e-mail: ftcsss@nontri.ku.ac.th

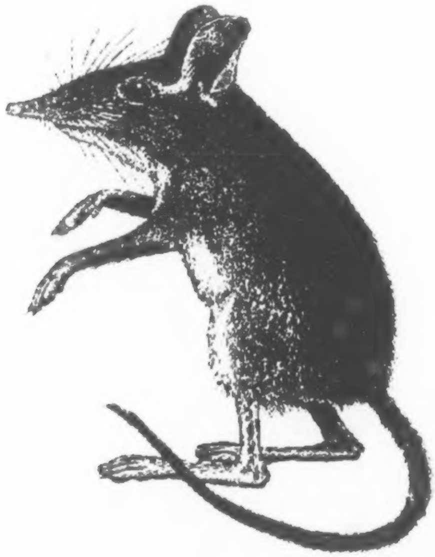
Latin America and Caribbean (Spanish):

Revista Bosques, Arboles y Comunidades Rurales
c/o CIED
Av. Santa Cruz 500, Jesus Maria
Apartado 11-0152
Lima 11, Peru
Fax: (51-1) 330-5862
e-mail: ftpp@sifocom.org.pe

Europe:

The Editor, FTPP Newsletter
Swedish University of Agricultural Sciences
Box 7005
Upsalla 75007 Sweden
Fax: (46-18) 673420
e-mail: daphne.thuvesson@ibutv.slu.se

North America and Caribbean (English):

FTPP/NACARCE
North American & Caribbean Regional Center
5400 Grosvenor Lane
Bethesda, Maryland 20814 USA
Fax: (001-301) 897-3690
e-mail: istfiusf@igc.apc.org